
STRATEGIC MARKET PERSPECTIVE

Enterprise-Wide Database
Services, European User
Perspectives

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Enterprise-Wide Database Services, European User Perspectives

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Abstract

Enterprise-wide databases are critical to the success of many large corporations. Database technology is now used for essential transaction, decision support and marketing activities. Additionally, databases are increasingly being used as platforms for integrated business applications such as SAP's R/3.

Matching today's distributed database technology to business needs and ensuring that enterprise-wide databases facilitate the execution of those needs is increasingly difficult to undertake using in-house resources.

However, widespread scepticism exists in the user community concerning the costs of using external vendors to design, implement and maintain distributed database architectures.

This scepticism is counteracted by a keenness to take advantage of new technologies while avoiding the problems associated with supporting existing applications.

Given the complexities involved in both today's business requirements and the technology that is available to carry out many business processes, enterprises are coming under increasing pressure to work closely with external services vendors where possible.

This report analyses the demand-side of the IT services market centred around enterprise-wide databases in Europe today, and describes:

- The challenges facing users when, planning and designing, implementing, and supporting enterprise-wide databases
- The current trends that are driving the market for services centered around enterprise-wide databases.

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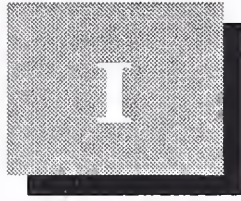
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Introduction

This report was produced as part of INPUT's Software Product Support Programme in Europe.

A

Objectives and Scope

The use of distributed database technology across the enterprise is precipitating a greater need for services that enable enterprises to effectively:

- Plan and design their database infrastructures
- Implement their databases
- Support and maintain their databases
- Provide training to database users.

However, increasingly enterprises are unable to satisfy these needs using only in-house resources. This is creating an opportunity for external vendors to generate revenue from the provision of services centred around enterprise-wide databases.

The purpose of this report is to provide an understanding of the demand-side of the IT services market centred around enterprise-wide databases in Europe today, and to clearly identify:

- The challenges facing users when planning and designing, implementing and supporting enterprise-wide databases
- The current trends that are driving the market for services centred around enterprise-wide databases.

B**Methodology**

This report is based largely upon a survey of IT Managers who use enterprise-wide databases. 117 IT Managers were interviewed in late November 1996. Interviews were undertaken with IT managers in the following countries:

- France
- Germany
- Italy
- The United Kingdom.

Exhibit I-1 illustrates the distribution of interviews by country.

Exhibit I-1

Interview Profile by Country

Country	Number of Interviews
France	30
Germany	31
Italy	24
UK	32
Total	117

Source: INPUT

Exhibit I-2 illustrates the major publishers of the databases used by interviewees.

Exhibit I-2

Interview Profile by Publisher of Database

Database Publishers	Number of Occurrences
IBM	30
Oracle	25
Sybase	7
Informix	6
Other	49
Total	117

Source: INPUT

C

Report Structure

The remaining chapters of this report are as follows:

- Chapter II is an executive summary which provides an overview of the key findings of the study
- Chapter III analyses the major challenges faced by users when planning and designing, implementing, and supporting their enterprise-wide databases. It also analyses training issues relating to enterprise-wide databases. Furthermore, it reveals opportunities that these challenges offer to vendors.
- Chapter IV analyses the major trends that are driving today's services market centred around enterprise-wide databases.
- Chapter V analyses the survey findings by country (France, Germany, Italy, and the United Kingdom).
- Appendix A contains the user questionnaire used for the study.

D

Related INPUT Reports

Other INPUT reports which address topics related to the subjects discussed here include the following:

Strategy and Positioning of Leading IT Support Vendors, Europe 1996

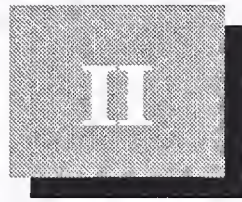
The Impact of the Internet on Software Product Support, Europe 1996

The Future of IT Support - Multivendor Services in Europe, 1995-2000

Delivering Customer Service Through The VAR Channel — Europe 1995

Software Product Support Market Analysis and Trends, Europe 1996 - 2001

Help Desk Service Opportunities



Executive Overview

A

Distributed Database Technology Exposes Services Opportunities

Enterprise-wide databases are critical to the success of many large corporations. Database technology is now used for essential transaction, decision support and marketing activities. Additionally, databases are increasingly being used as platforms for business applications such as SAP's R/3.

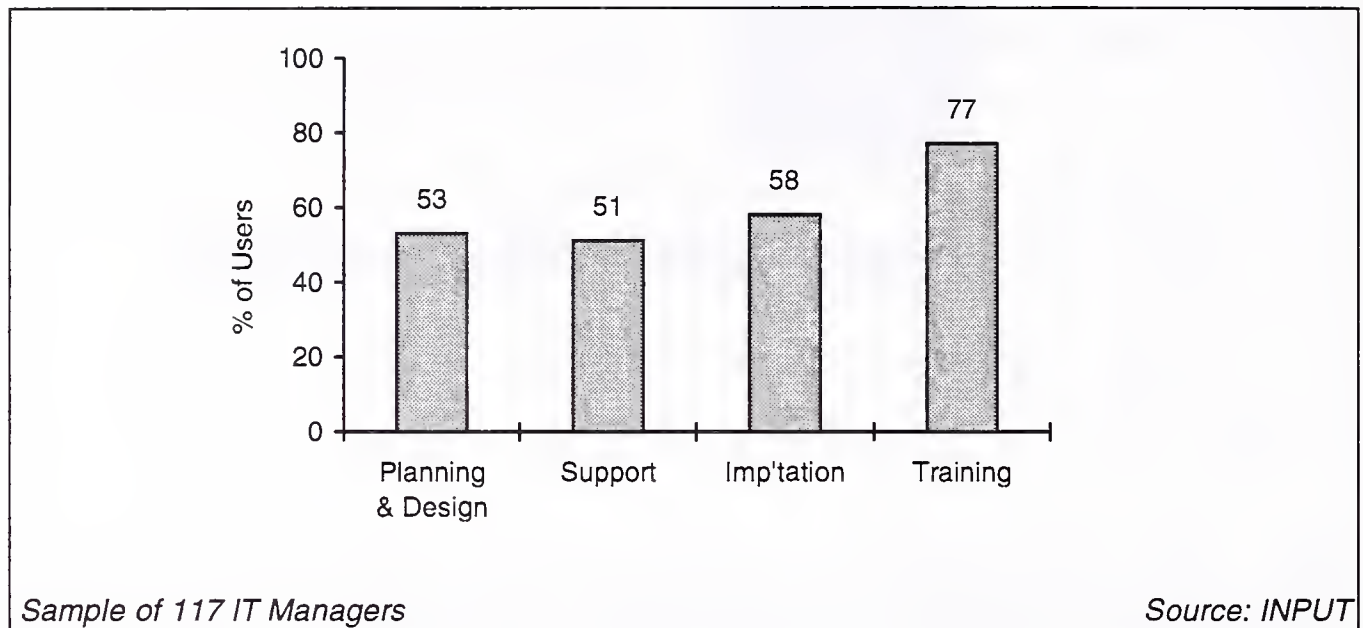
Matching today's distributed database technology to business needs and ensuring that enterprise-wide databases facilitate the execution of those needs is increasingly difficult to undertake using only in-house resources.

However, widespread scepticism exists in the user community concerning the costs of using external vendors to assist with the design, implementation and support of distributed database architectures. INPUT research reveals that just under 50% of enterprises do not purchase any database services relating to planning, designing, implementing, and supporting their databases from external vendors.

Exhibit II-1 illustrates the proportion of enterprises that purchase at least some of their services centered around enterprise-wide databases externally.

Exhibit II-1

Proportion of Users Sourcing Database Services Externally, Europe



Today's distributed technology enables users to leverage database infrastructures in order to reap the full benefits of client/server business applications. Furthermore, enterprises are increasingly implementing data warehouses to assemble data from disparate sources, replicate, cleanse, store and catalogue it, in order to make it available for business processes. Increased usage of object technology, and the Web as a database front end, are offering further services opportunities.

Given the complexities involved in both today's business requirements and the technology that is available to carry out many business processes, enterprises will increasingly work with external services vendors where possible.

Against this background, INPUT research reveals that:

- Users question the value of services centred around enterprise-wide databases
- Users require business applications expertise from database services vendors
- Users require customised migration services from database services vendors
- Database publishers are poised to benefit from enterprise-wide database services opportunities
- Vendor services offerings must complement in-house resources.

B**Users Question the Value of Database Services**

The main reason that in-house resources are used for planning, implementing, and supporting enterprise-wide databases is that the perceived cost of services offered by external vendors is high.

Users believe that many services centred around enterprise-wide databases do not offer value for money. They need to be convinced that services sourced from external vendors will bring them demonstrable benefits. By clearly outlining the benefits that users can gain from services, vendors can increase the perceived value of their offerings.

However, demand is currently strong for high value services relating to data warehousing, the integration of business applications with databases, and web-enabled databases. The increased need for services in these areas offers the greatest opportunities to deliver value to users.

Additionally, users are demanding services that focus on business processes as opposed to technology, offering vendors the opportunity to charge a premium for these services.

Essentially, the opportunity to provide consultancy services centred around enterprise-wide databases is growing and relatively high margins can be derived in this area.

Further opportunities exist in the lower value departmental/workgroup market segments where database technology is becoming more widespread. Vendors are now encountering users with relatively low budgets who require services.

Lower value services, in particular reactive support and installation are becoming commoditised. This trend is being driven by:

- The use of new technologies, primarily the Internet
- Competition from vendors that specialise in reactive support services.

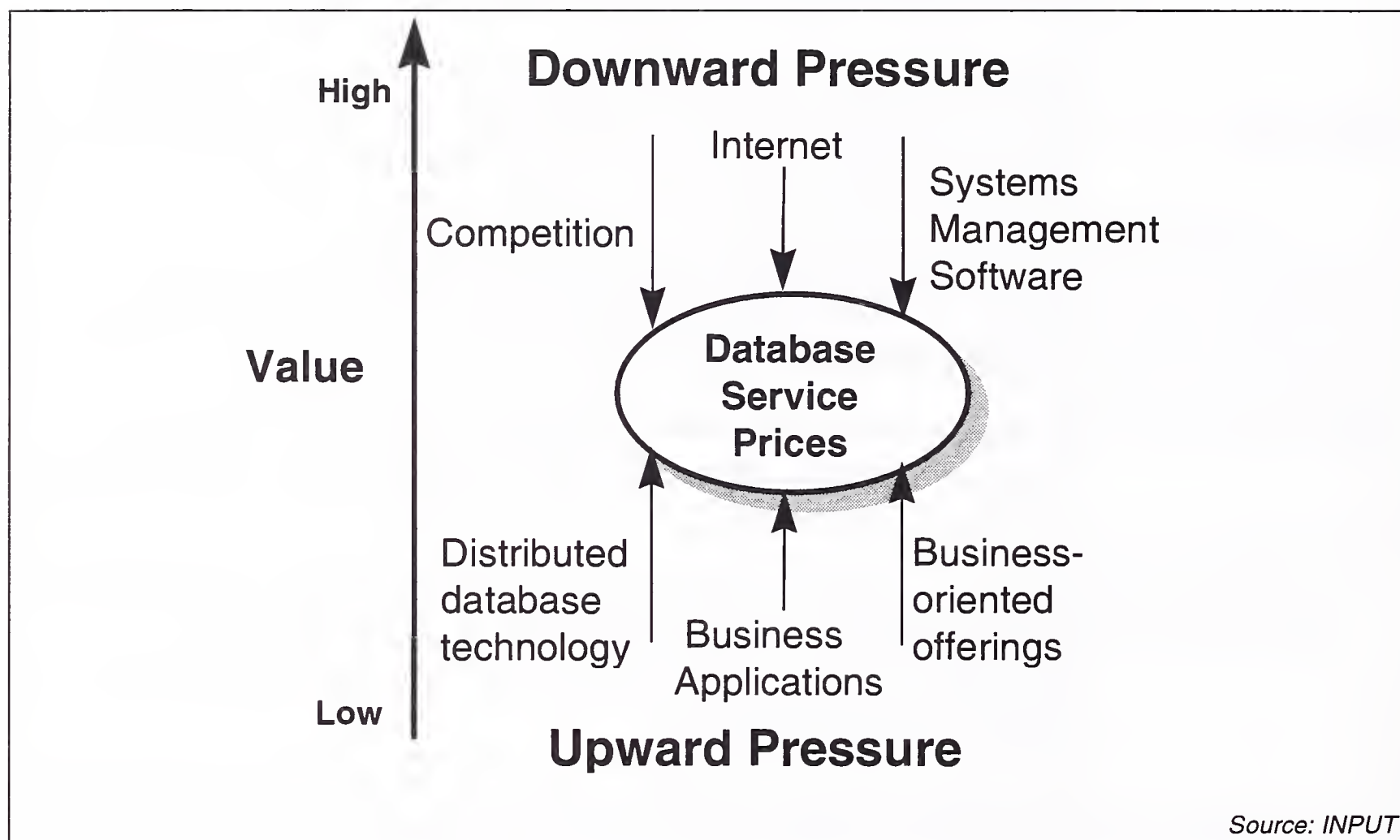
Intelligent Web-based applications such as Inference's CBR2 technology can deliver ever higher levels of reactive support at a low cost. Installing and monitoring software from remote sites also enables vendors to reduce the costs of certain services.

A number of vendors that focus on the provision of high volumes of support to and on behalf of a wide range of organisations have emerged. Examples of such organisations include Stream, PSC-Softbank and Sykes. These organisations are deriving significant economies of scale from their activities and are consequently lowering the costs of certain types of service activities such as reactive support and software installation.

Exhibit II-2 illustrates the pressures that are currently influencing the prices of services centred around enterprise-wide database products.

Exhibit II-2

Factors Influencing Database Services Prices

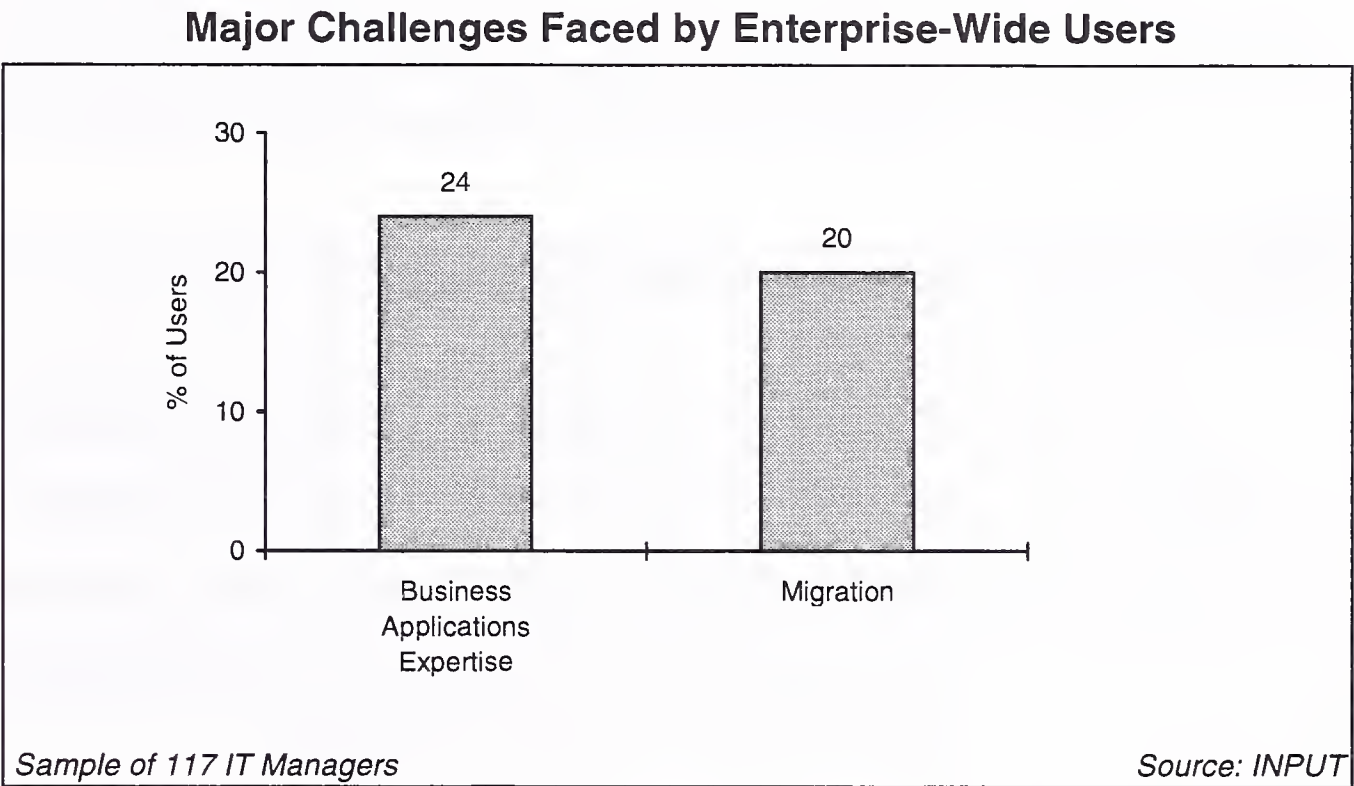


C

Vendors Must Offer Business Applications Expertise

Exhibit II-3 illustrates the proportions of users who mentioned the need for business applications expertise and migration issues when asked to specify the major challenges that they faced when planning and designing, implementing, and supporting their enterprise-wide databases.

Exhibit II-3



Increasingly, specific business needs are being met by business applications that run on database infrastructures. Hence, ensuring that enterprise-wide databases are closely integrated with business applications is becoming very important to corporations.

The once highly fragmented business applications market is consolidating. Vendors such as SAP, Baan, PeopleSoft, JD Edwards and Oracle now offer integrated, enterprise-wide business applications that carry out specialised business processes.

Today, enterprise-wide IT solutions are typically focused on business applications, regardless of the software on which these products run. In order to enjoy the full benefits of their business applications, the deployment of enterprise-wide database infrastructures is frequently necessary. Hence, database services vendors are working to ensure that the most common business applications can run on their databases. For example, IBM, Informix, Microsoft, Oracle and Software AG have worked closely with SAP, the leading ERP software vendor, to ensure that SAP's R/3 can run on their products.

Many users continue to experience problems with integrating business applications and databases. In particular, locking issues are mentioned as causing problems with linkages.

Thus, when providing services centred around enterprise-wide databases, expertise relating to compatible business applications is increasingly required. Frequently, systems integrators such as Andersen Consulting, Price Waterhouse and the systems integration arms of many systems vendors, provide all the services necessary to enterprises involved in the implementation of business applications on enterprise-wide database infrastructures. Such vendors increasingly offer data warehousing solutions designed to complement business application implementations.

D

Vendors Must Provide Customised Migration Services

In addition to the complications involved in integrating database infrastructures with business applications, the transition from old database environments to new ones poses challenges to users.

Given that a fifth of enterprise users encounter difficulties in transferring their business data from their old infrastructures to new database environments, vendors have an opportunity to generate revenues by offering services that focus on this area.

Existing database infrastructures within the enterprise typically carry out business critical processes. Hence, users can ill-afford any downtime and require a seamless transition between databases. The transition must maintain data integrity, and deal with all inherited data structures, as users express particular concern with regard to these two issues.

The migration period also raises difficulties relating to the sheer amount of data that is often transferred. It offers users the opportunity to select the correct data to be used and dispose of redundant data. Furthermore, any migration process must ensure that the best ways of manipulating data are in place once the database has been populated with appropriate data.

In addition, once the new database is deployed, many enterprises experience problems in fostering staff acceptance of the new infrastructure.

Although these issues are problems from the users' perspective, they offer vendors excellent opportunities to provide customised migration services.

Vendors can offer migration services that guarantee business continuity during transition periods. They can also generate further revenues by analysing user business processes, and ensuring that the data necessary for those processes populates the database.

Fostering staff acceptance of a new database implementation is not a service that can feasibly be offered. However, vendors can offer customised training services during the implementation process which relate directly to the business. Ideally, 'hands-on' courses that demonstrate the functionality of the database as a business tool should be offered. A lack of acceptance of new technology is often related to a lack of understanding by users of the tangible business benefits that technology can offer.

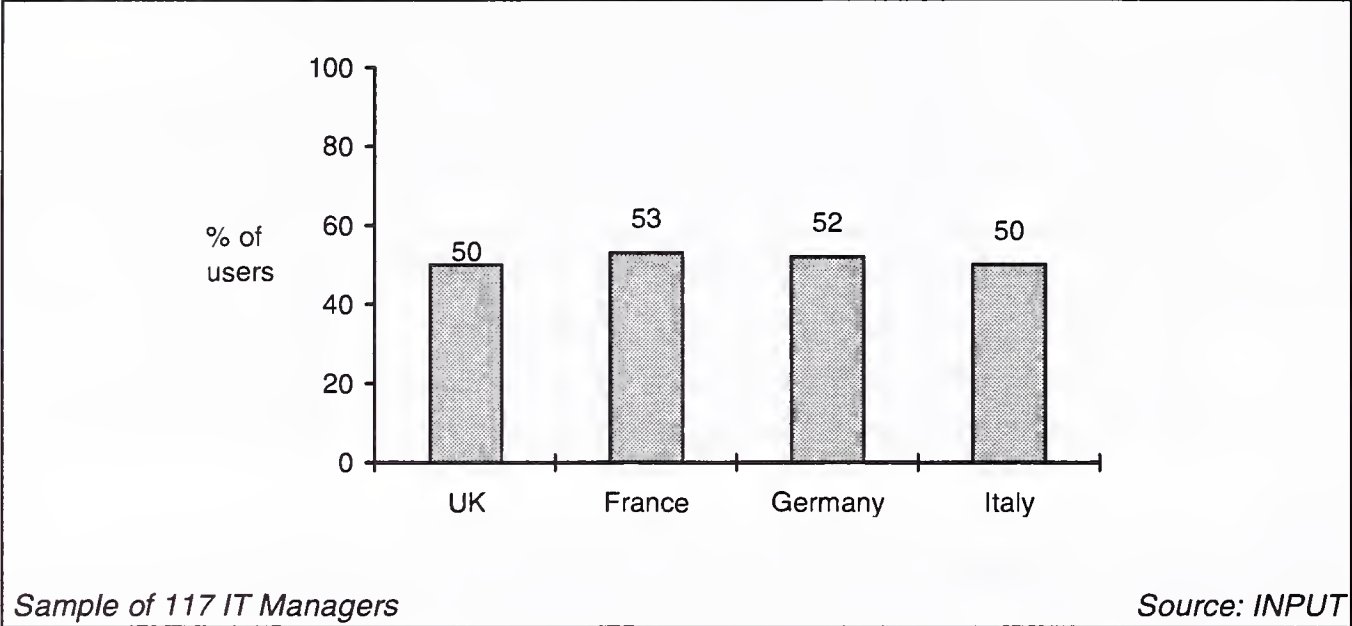
E

Database Publishers Poised to Benefit from Services Opportunity

As database products become more commoditised, database product vendors, in particular IBM and Oracle are positioning themselves as services companies that can provide all the services that their database customers might require. This is a necessary step given that over half of enterprises across Europe believe that purchasing all their services requirements centred around databases from one source is important (see Exhibit II-4).

Exhibit II-4

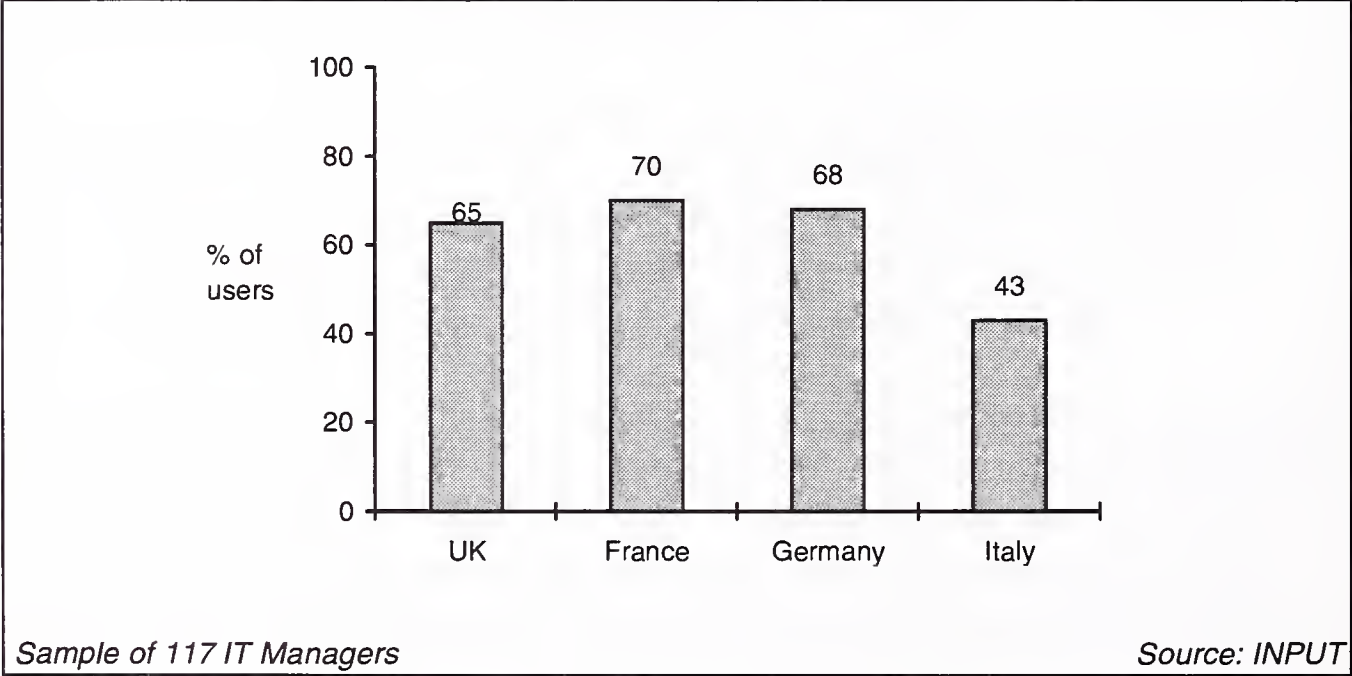
Proportion of Users who Believe that a Single Source for All Database Services is Important, Europe



Furthermore, across Europe as a whole, the majority of users believe that it is important to source services centred around databases from the publisher of the database to be used (see Exhibit II-5).

Exhibit II-5

Proportion of Users who Believe that Sourcing Services from the Publisher of the Database Product is Important, Europe



Most database vendors are responding to services opportunities. IBM, Oracle and Computer Associates offer a broad suite of services. Sybase and Informix are also ramping up their services infrastructures. Interestingly, Sybase has outsourced much of its first line support function to call centre specialist, Sykes, allowing it to focus on higher value service activities.

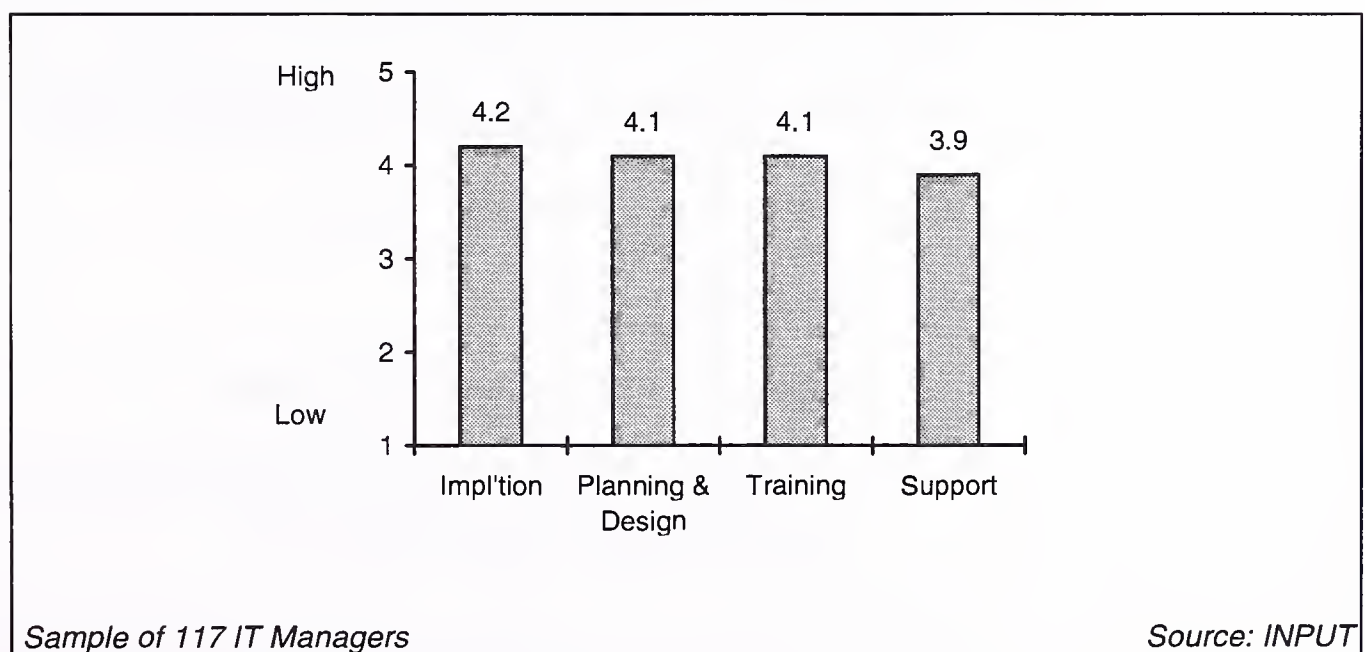
Unlike most other database vendors, Microsoft aims to avoid becoming too heavily involved in services. This can be explained by its traditional strengths in the desktop market where the services market has been less lucrative. However, as with its desktop products, it is also trying to encourage third parties to provide most of the services centred around its BackOffice products (which includes Microsoft SQL Server) even though these products are commonly found in enterprise environments where the most profitable services opportunities exist.

In response to demand from enterprises who requested direct support, Microsoft has built up an infrastructure to deal with these accounts. It has upgraded its support offerings for the enterprise with its AnswerPoint and Service Advantage support offerings, and the Microsoft Consulting Services (MCS). Even though significant revenues can be generated from the provision of services to the enterprise, Microsoft still encourages third parties to provide services centred around its products.

Despite the difficulties involved in providing services centred around enterprise-wide databases to large organisations, users express a high level of satisfaction with services provided by external vendors (see Exhibit II-6).

Exhibit II-6

User Satisfaction with Database Services



Moreover, when segmented by vendor, users also showed a high level of satisfaction with each vendor's services (see Exhibit II-7).

Exhibit II-7

User Satisfaction by Vendor — Europe

Vendor	Planning & Design Services	Implementation Services	Support Services	Training Services
IBM	4.4	4.5	3.7	4.2
Oracle	3.8	4.3	4.0	4.0
Sybase	4.0	4.0	3.9	3.8

Source: INPUT

F

Vendor Offerings Must Complement In-House Resources

INPUT research reveals that of those users who purchase services from external vendors, over 90% are satisfied with what they receive. Hence, most users of these services will continue to purchase database services externally, and given today's business climate are unlikely to invest in in-house resources to provide these services.

Nearly 50% of enterprises continue to provide their planning and design, implementation and support requirements using in-house resources. INPUT research exposes the following reasons for using in-house resources as opposed to services sourced from external vendors:

- Cost issues, as discussed earlier
- Security concerns
- A desire to fully control IT activities
- The perception that external vendors will have an insufficient understanding of their businesses.

It is difficult for any vendor to alleviate security concerns that exist in sensitive industries. Nevertheless, vendors can alleviate the other aforementioned concerns.

One of the most frequently voiced concerns among users is that vendors will wrest control of a business critical component of the enterprise's IT infrastructure.

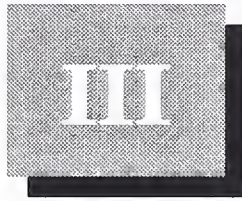
Furthermore INPUT research reveals that many of these users are concerned that communication with external vendors is poor.

Vendors must therefore ensure that the client is in control of all activities. The services vendor should work as closely as possible with the user, allowing the user to review their activities whenever they wish. The vendor should also report to the user on a regular basis, stating clearly what has been achieved and what will be achieved. Vendor marketing activity should focus on reassuring the user that the vendor will be working for them.

Perhaps, most importantly, vendors must be capable of tailoring their services offerings to the specific needs of each enterprise client. Many users do not believe that vendors can have a sufficiently close understanding of their business processes to successfully adapt enterprise-wide databases to carry out those processes.

Vendor marketing activity should focus more strongly on the processes which database technology can facilitate.

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Enterprise-Wide Database Services — User Concerns and Vendor Opportunities

This chapter will examine the major user concerns with services centred around enterprise-wide database products and the opportunities that these concerns create for vendors throughout the services lifecycle.

A

Enterprises Lack Planning & Design Expertise

The first part of the services lifecycle is the planning and design phase. Designing a database infrastructure that meets current business needs and is sufficiently future-proof to guarantee a return on investment is a tortuous exercise.

The need for an understanding of the benefits that can be derived from distributed database technology and an ability to match the correct technology to specific requirements is proving an obstacle to many enterprises. Enterprises are increasingly discovering that they simply do not have the in-house expertise to successfully plan and design a suitable database infrastructure.

However, many enterprises continue to plan and design their database infrastructures in-house. Recent INPUT research reveals that this can be explained by:

- The existence of in-house resources
- Cost concerns
- A belief that external vendors do not understand the business processes of their prospective clients
- A belief that external vendors do not understand the previous database infrastructure of prospective clients
- Security concerns
- A desire not to be influenced by external vendors.

INPUT research reveals that users encounter many problems when planning and designing their databases, whether or not assistance is provided by an external vendor, including:

- Managing expectations of what can be achieved
- Understanding the requirements of senior management
- Ensuring adequate database response times
- Managing the integration of the database infrastructure with business applications
- Bringing corporate information together
- Ensuring that suitable access arrangements are established
- Ensuring a gradual seamless evolution from the previous database infrastructure
- Lack of in-house expertise
- Too many people becoming involved in the project
- Difficulty in meeting deadlines
- Poor communication between in-house and external staff.

By ensuring that planning and design services answer these user concerns, vendors will attract more enterprises to their offerings. Research indicates that planning and design services should:

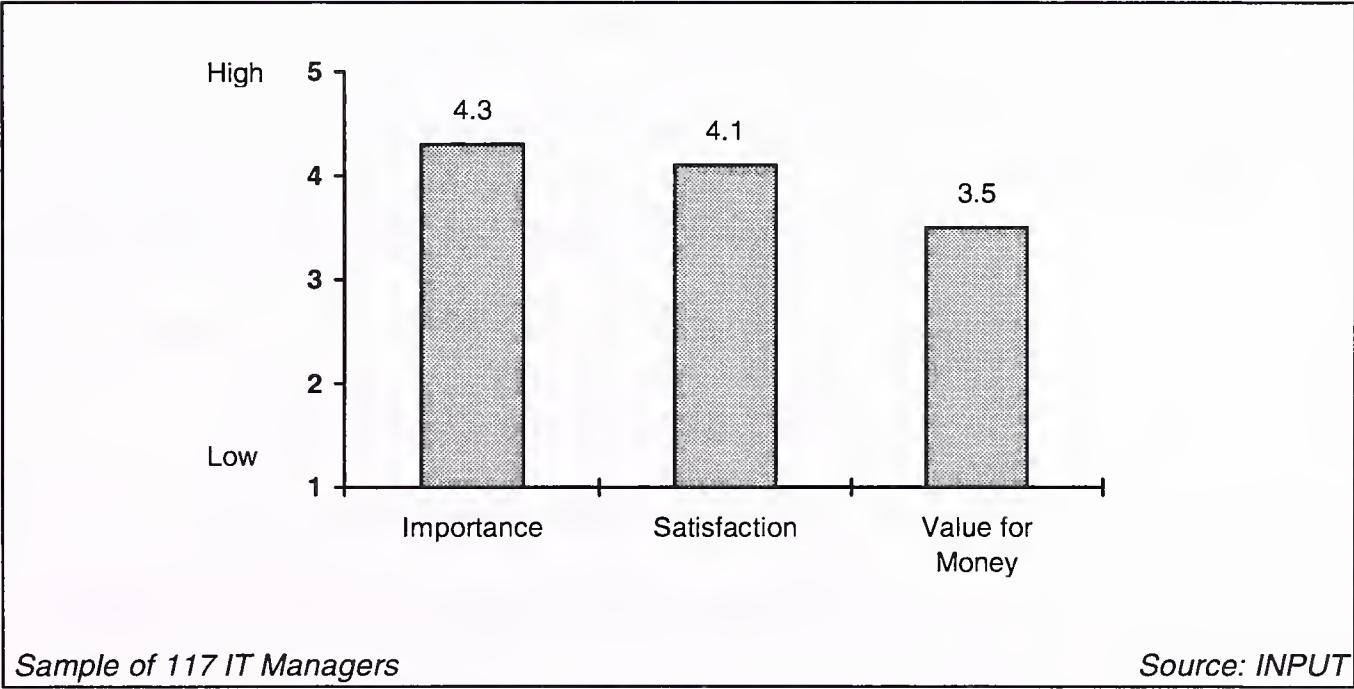
- Include quality indicators to demonstrate value to the customer
- Adhere to strict deadlines
- Involve in-house staff
- Involve an element of training
- Demonstrate a clear understanding of clients’ business processes
- Ensure adequate communications with customers; keep customers informed of status regularly.

Of the 49% of enterprises that currently source planning and design services externally, satisfaction levels are high (see Exhibit III-1).

However, many users do not believe that they are receiving value for money. As customers demand services that are tailored to their particular businesses, the costs of such services will inevitably increase, so vendors must find ways of demonstrating the value that their planning and design or consultancy services deliver to customers’ businesses.

Exhibit III-1

User Perceptions of Externally Sourced Database Planning & Design Services, Europe



B

Implementation Exposes Shortcomings

Once a database environment has been adequately planned and designed, enterprises must implement it.

Many enterprises continue to use in-house resources for database implementation purposes for the following reasons:

- The existence of in-house resources
- A desire to have total control over such a business critical activity
- An opportunity to develop an understanding of the software - a good training exercise
- The perception that it will cost more to use an external vendor to implement a database infrastructure than to do it in-house
- Security concerns.

INPUT research reveals that users encounter many problems when implementing databases either with or without external assistance including:

- Ensuring that the database can handle the population size
- Dealing with too much data
- Selecting necessary data
- Conversion from old systems
- Integrating business applications with the database
- Integrating the database with existing operating environments
- Interruption of business activities
- Ensuring adequate data continuation
- Fostering staff acceptance of the new system
- Meeting performance requirements.

Implementation services must answer these concerns. Database services vendors must:

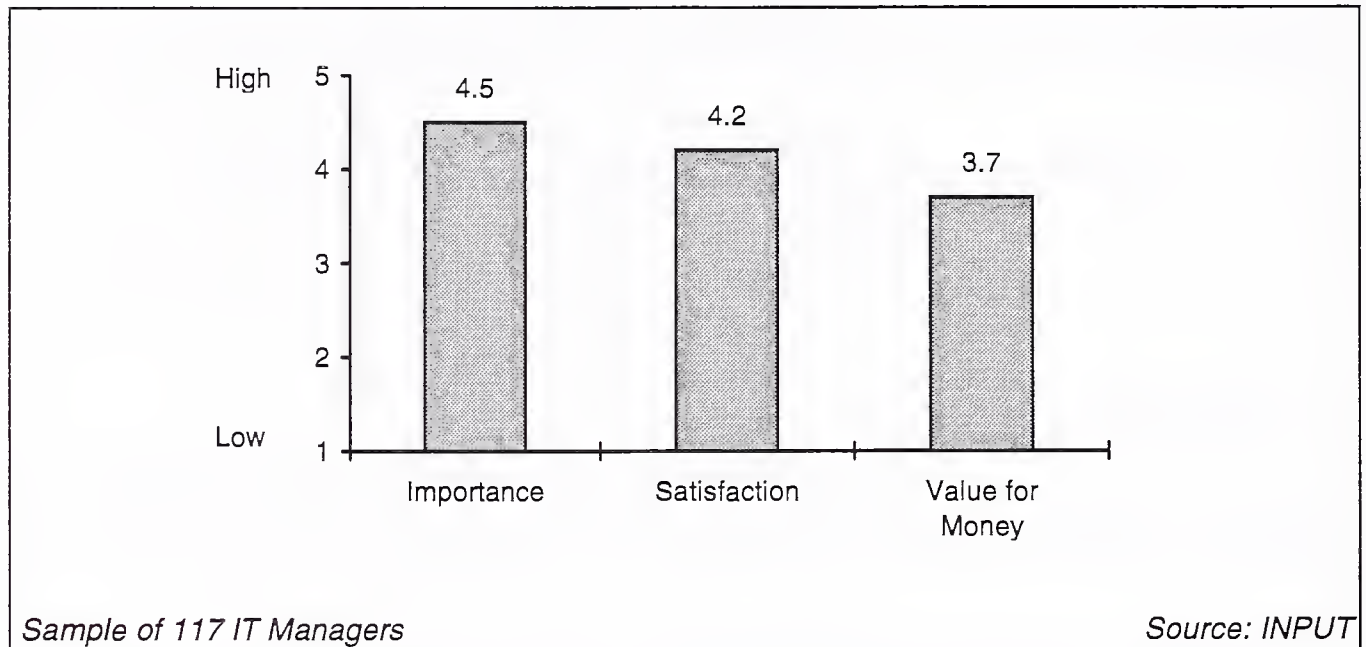
- Control costs by offering implementation services remotely
- Ensure effective lines of communication with in-house staff throughout the implementation phase
- Minimise downtime of previous systems during implementation
- Include an element of training
- Partner with business applications vendors to ensure that their products will run appropriately on the database
- Ensure data integrity and continuation during conversion from old systems
- Ensure that the database carries out the business processes for which it was purchased.

Nearly 60% of European enterprises source implementation services from external vendors. INPUT research reveals that satisfaction with these services is high (see Exhibit III-2). However, as with planning and design services, many users do not believe that they are receiving value for money.

Database software products are frequently shrink-wrapped and are therefore becoming easier to implement. If significant numbers of users continue to believe that vendors do not offer cost effective implementation services, they will implement their databases using in-house resources relatively painlessly. In order to attract users to implementation services, vendors must keep costs to a minimum. Costs can be reduced by using point-to-point and Internet technology where possible.

Exhibit III-2

User Perceptions of Externally Sourced Database Implementation Services, Europe



C

50% of Enterprises Use In-House Resources for Database Support

Having implemented a database, enterprises all too frequently struggle with supporting and maintaining their new systems. The difficulties involved in ensuring that the database runs seamlessly within its operating environment and that business applications running on databases carry out business processes effectively, drive the need for an extensive support infrastructure.

However, 50% of enterprises continue to cater for most of their support requirements in-house. This can be explained by:

- The prevalence of in-house IT support infrastructures
- Security issues - the need for confidentiality
- The perceived cost of external support provision
- The desire to use information gleaned from support requirements to formatively enhance the system.

INPUT research reveals that users encounter many problems once the database is running. The problems include:

- Scalability problems
- Locking problems
- The technical limitations of the database
- Monitoring multiple sites
- Ensuring data integrity
- Correct usage of applications
- Maintaining performance levels.

Users outlined the following problems with their existing support infrastructures:

- Long response times when problems occur
- A lack of language skills
- Poor documentation
- A lack of pro-active support
- Lack of resources from senior management for support
- Lack of multivendor expertise from support organisations
- Poor version control.

INPUT's survey analyses user perceptions of software support services by the functions shown in Exhibit III-3.

Exhibit III-3

User Perceptions of Software Support Services, Europe

	Importance	Satisfaction	Difference
1st Line Help Desk Support	4.5	4.1	0.4
Engineering Skills	4.4	4.2	0.2
Problem Escalation	4.3	4.0	0.3
Support Documentation	4.3	3.8	0.5
Update Provision	4.1	3.9	0.2
2nd Line Help Desk Support	4.1	4.1	0.0
3rd Line Help Desk Support	4.1	4.1	0.0
Remote Software Maintenance	3.5	3.7	-0.2
Support via the Internet	2.1	3.4	-1.3

Sample of 117 IT Managers

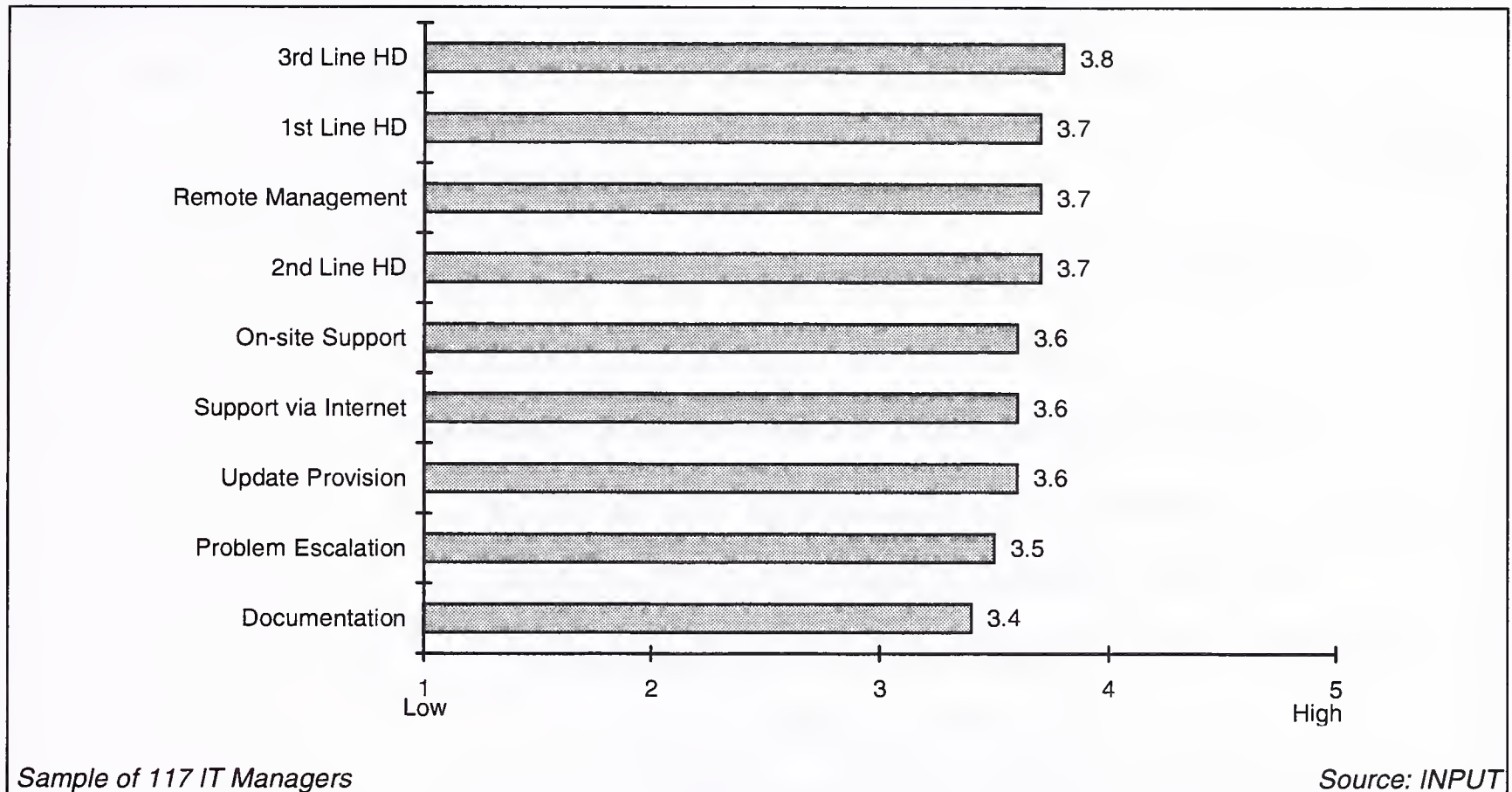
Source: INPUT

Perhaps surprisingly, users express high levels of satisfaction with most types of database support offering. With the exception of support documentation, remote software maintenance and support delivered via the Internet, the differences between user's perceptions of the importance of, and satisfaction with, various support activities are relatively small. This bodes well for database support vendors considering that support has traditionally been an area in which customer criticism has been intense.

Interestingly, users do not yet perceive electronic support services to be very important. In particular, support via the Internet is deemed to be of low importance. As increasing numbers of applications migrate to the Internet and it can offer more functionality, database users will deem it to be a more important support delivery channel.

In common with user attitudes to planning and design, and implementation services, the gaps between user perceptions of satisfaction/importance and value for money are significant (see Exhibit III-4).

Exhibit III-4

User Perceptions of Value for Money — Support Services, Europe

Vendors must respond to user concerns regarding the cost of support by offering more flexible support options, thus enabling users to spend less on support.

Indeed, the costs of providing support are being driven down by two major factors:

- Technology in the form of distributed help desk technology, systems and network management software, and the use of the Internet as a support delivery channel
- Competition from support specialists such as Stream, Sykes and PSC-Softbank who are reaping economies of scale from focusing on support services.

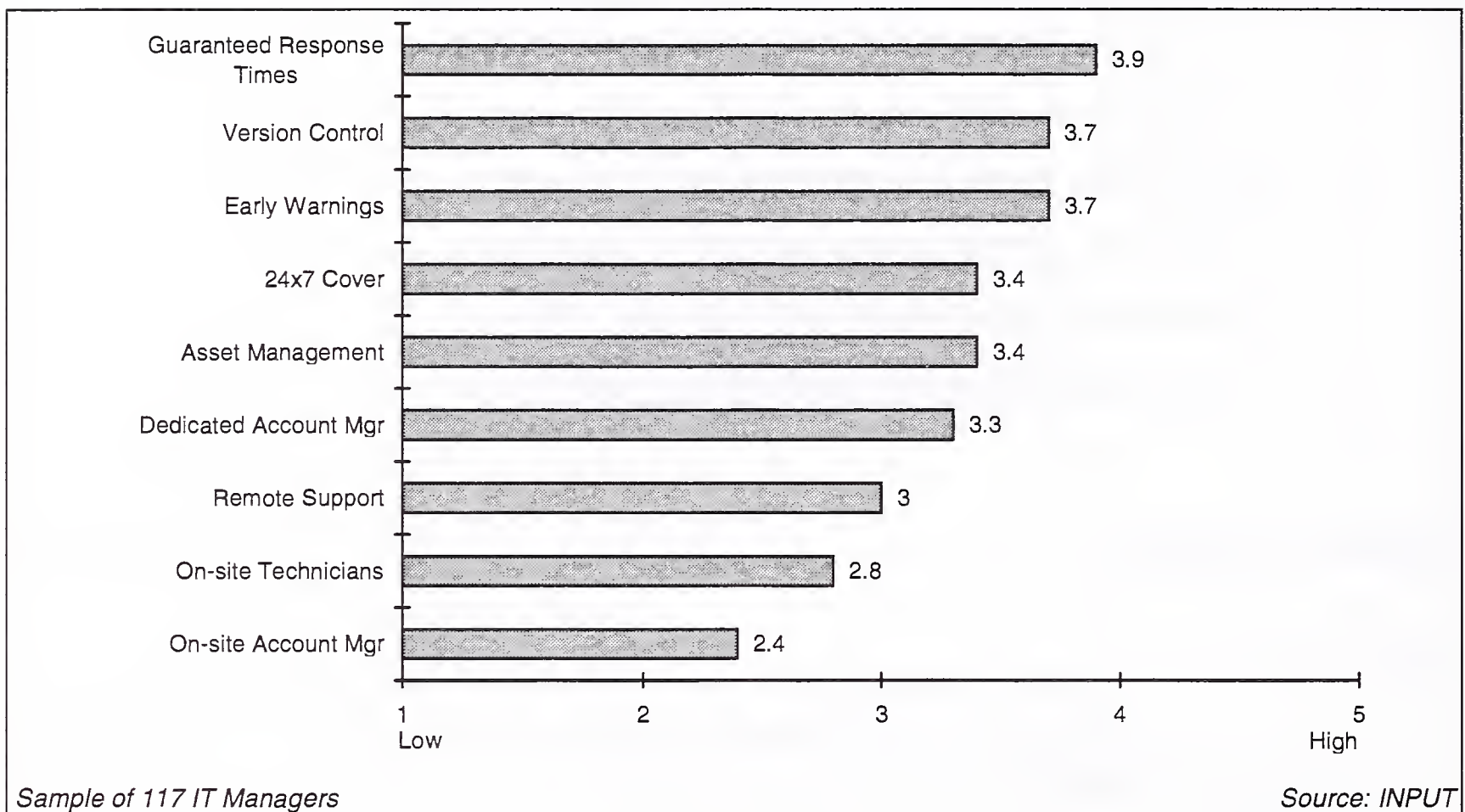
Database support vendors are responding by:

- Offering low price support packages
- Increasing the perceived value of their support packages
- Offering higher value support offerings with additional options.

INPUT research reveals the additional support options that users perceive to be important (see Exhibit III-5). By including such options in a support package or allowing users to customise their own support service, vendors can increase support revenues or at least prevent them from falling.

Exhibit III-5

Importance of Database Support Options, Europe



In summary, vendors can attract users to their support services by offering:

- Guaranteed response times
- Version control services, delivered remotely where possible
- Services that notify users of problems in advance (pro-active support)
- An understanding of the customer's business processes
- Initial training and clear, concise documentation as part of a support contract.

D

Training Services Mainly Provided by External Vendors

Unlike other services centred around database software products, nearly 80% of enterprises source training services from external organisations, most commonly the publisher of the database product.

This can be explained by:

- A lack of in-house expertise
- Insufficient time to build up in-house training capabilities
- Lower cost of sourcing training expertise externally as opposed to employing skilled training staff on a permanent basis.

INPUT research reveals that the major problems faced by users when training their staff include:

- Training is too generic; it doesn't relate to the business processes and IT infrastructures of enterprise users
- Training courses do not involve sufficient on-site training or 'hands-on' experience
- Some trainers exhibit a low level of competence
- Training material is not updated frequently enough
- Documentation is unsatisfactory
- Training is too expensive.

Vendors can enhance their training services by offering:

- Training courses that are tailored to specific business needs
- Practical, 'hands-on' training courses
- Trainers who have reached an established competence level
- Clear, and concise documentation that follows didactic principles
- Courses geared to users with low levels of technical knowledge

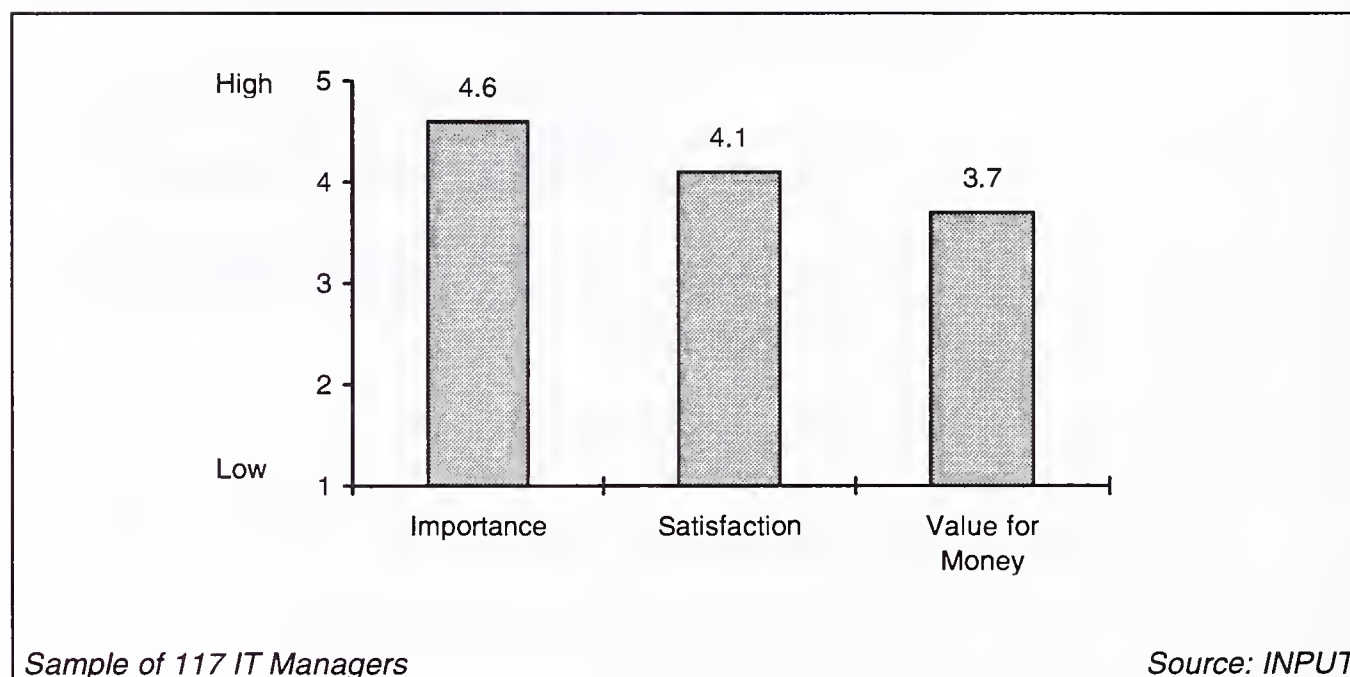
- Formative training courses that run throughout the product lifecycle
- Training aids such as interactive courseware.

Nearly 80% of enterprises in Europe source training services from external vendors. INPUT research reveals that satisfaction with these services is high (see Exhibit III-6).

Furthermore, despite frequently voiced concerns about the cost of training, most users give a high rating for the value for money obtained from training services. Indeed, the provision of training offers vendors a lucrative market to exploit further, given the importance that users place on it.

Exhibit III-6

User Perceptions of Database Training & Education Services, Europe



IV

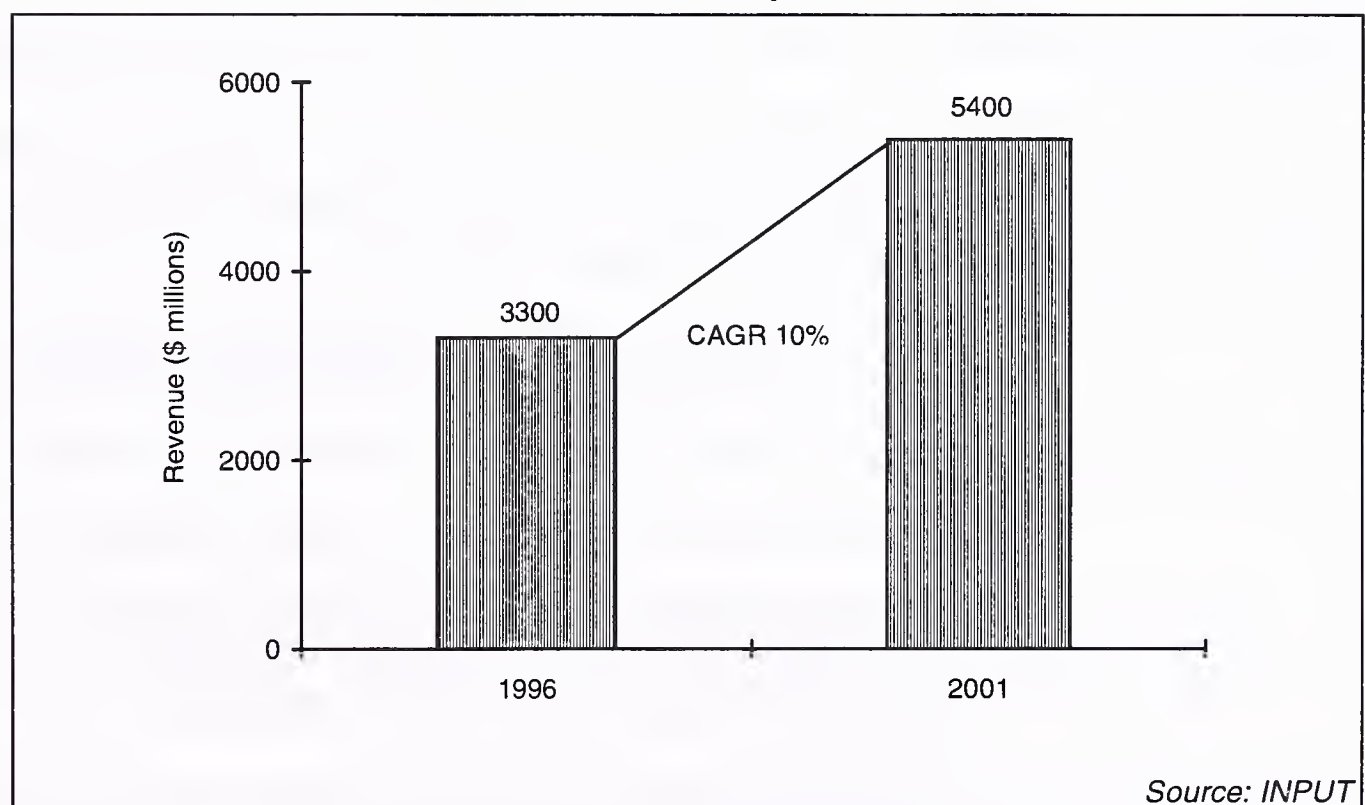
Emerging Trends

This chapter analyses the major trends that have emerged in the mid 1990s as drivers for the services market centred around enterprise-wide databases.

The market for relational databases continues to grow rapidly (see Exhibit IV-1).

Exhibit IV-1

RDBMS Market, Europe 1996-2001



In the mid 1980's, the emergence of relational databases coincided with the growing trend among enterprises to downsize. Enterprise-wide relational databases gave senior management access to decision making information that had hitherto been provided by teams of middle managers.

Additionally, relational databases enabled enterprises to carry out many different business processes more cost effectively.

These trends have been compounded by the emergence of the following factors which are leading the dynamic growth in the services market centred around database products:

- Improved performances of enterprise-wide databases facilitating the use of data warehouses and online analytical processing (OLAP) technology
- An increasing number of business applications that are supported by enterprise-wide databases
- The growing popularity of object technology
- Increased accessibility of database technology at the workgroup/departmental level
- An increase in the use of Web front ends for enterprise databases.

A

Business Benefits of Data Warehousing Must Be Clarified to Users

A data warehouse can be defined as an organic, distributed store of data that can collate and manage information from many sources, disseminate it, and activate business processes.

Typically, data warehouses are customised to specific user needs, thus they cannot be provided as shrink-wrapped solutions. Indeed, vendors normally piece together solutions derived from several sources.

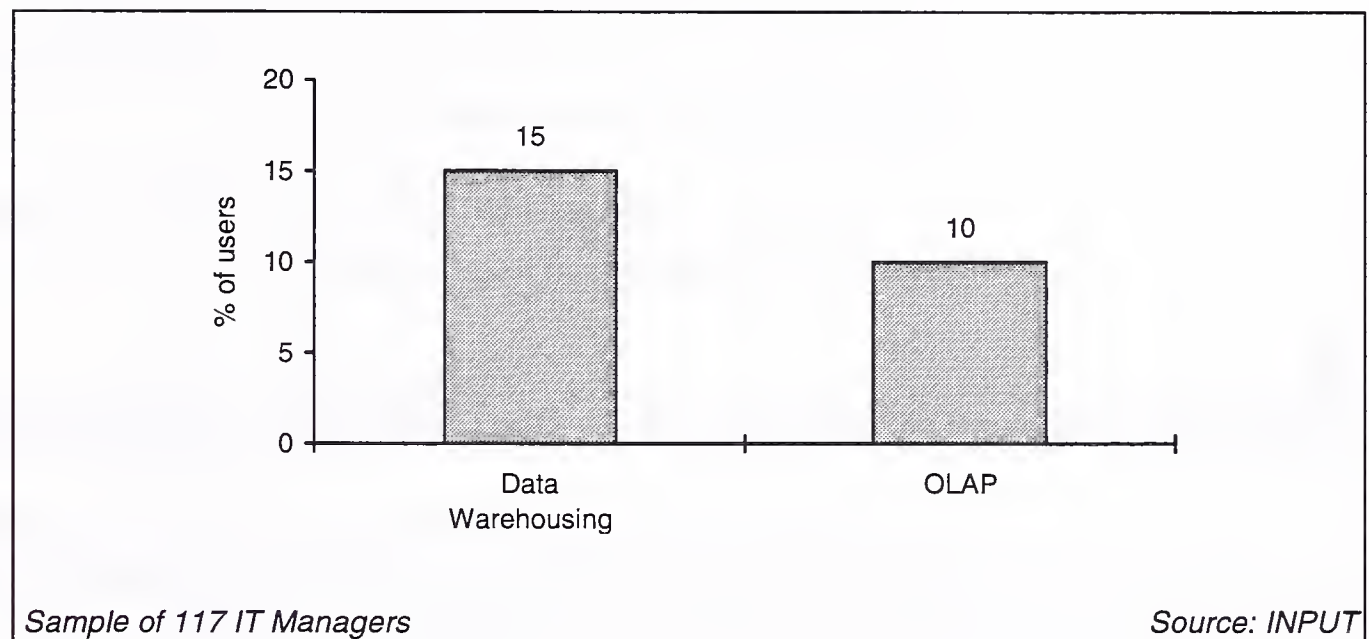
Data warehouses are particularly useful when data is held in a number of disparate applications distributed across the enterprise. They enable senior management to make strategic decisions based on collating data from repositories that are used for operational purposes.

The growing popularity of data warehouse solutions is opening up new opportunities for database services vendors. The complexity of planning and designing, implementing, and supporting data warehouses, combined with the business benefits that they can create, has led to significant demand for services centred around data warehouses. Most of the major database vendors have established dedicated data warehousing services divisions to tap this lucrative business.

In INPUT's recent survey, enterprise IT managers were asked if data warehousing technology was being used. Only 15% of IT managers responded positively (see Exhibit IV-2). When asked if OLAP technology was being used, only 10% of IT managers responded positively.

Exhibit IV-2

Proportion of Enterprises Using Data Warehousing and OLAP Technology, Europe



These findings indicate either that data warehousing solutions have not been adopted as rapidly as has been anticipated or that vendors do not understand the technical terminology used. Either way, vendors can make greater inroads with data warehousing technology if they sell the business benefits of the technology as opposed to selling technology of which many decision makers have little understanding

The business benefits to the enterprise of data warehousing are obvious considering that:

- Organisations have masses of disparate data types entering the enterprise from many different sources but are unable to deliver information to the decision makers who need it
- Data warehousing can get data out of impenetrable IT systems and into a customised repository where it can be analysed.

The concept of access to a repository of consistent, reliable, real-time data collated from the whole enterprise, offers enormous benefits to the enterprise whose information is distributed widely across different departments, different IT systems and different countries. In order to gain

data warehousing business, vendors can market data warehousing solutions on these grounds and avoid technical jargon wherever possible.

Of course, any data warehousing project opens up sizeable opportunities to vendors particularly in planning and design (consultancy) and implementation or systems integration. A data warehouse must be very closely mapped to business processes in order to ensure that enterprises are not left with multi-million dollar 'white elephants'.

Furthermore, any support offering must be complemented with a close understanding of the customer's business.

The services centred around data warehouses are all high value and offer vendors highly lucrative opportunities.

B

Business Applications Rely on Enterprise-Wide Database Infrastructures

Over the past 18 months, the fragmented business applications market has consolidated. Several vendors have emerged, most notably SAP, offering enterprise-wide business applications.

These products offer enterprises the necessary functionality to carry out business processes in their specific areas of specialism such as banking and manufacturing.

In order to fully enjoy the benefits of today's business applications, enterprises must run the software on enterprise-wide database infrastructures. Thus, the growth in demand for business applications is further driving demand for enterprise-wide databases and associated services.

Indeed, compatibility with business applications is essential for enterprise-wide database products. Databases which do not support the most popular enterprise-wide business applications are putting themselves at a competitive disadvantage.

Five enterprise-wide databases support SAP's R/3 system. R/3 is capable of supporting all commonly used databases, provided they can meet SAP's performance criteria.

However, the demands made of the databases by SAP, such as robust lock mechanisms, constrain the ability of many to support R/3. Indeed, Sybase suffered recently when both PeopleSoft and SAP stopped trying to port

their products to its database. PeopleSoft did eventually port its product to Sybase 11 but SAP will not do so until Sybase can support row-level locking. Microsoft worked intensively on row-level locking for its version of SQL Server on which R/3 will now run.

At present, the following databases support R/3:

- ADABAS D from Software AG
- DB2 for AIX from IBM
- DB2/400 from IBM
- Informix OnLine Dynamic Server
- Microsoft SQL Server
- Oracle 7.

Although Oracle's business applications compete in the same space as many enterprise-wide business application vendors, the size of its installed base of relational databases drive its competitors to port their products to its database products.

Indeed, Oracle partners very closely with SAP which is understandable given that 80% of SAP R/3 customers use Oracle 7 as their database infrastructure.

Oracle recently launched a campaign to deliver services to Oracle and SAP customers. It offers a service that helps users to link their R/3 applications with Oracle's data warehouse software including the Oracle7 database and Oracle Express OLAP products which are critical to its success in the data warehousing market.

The implementation of a successful data warehouse that can release the full potential of a business application under which it lies necessitates the integration of many technology components and generates significant services opportunities.

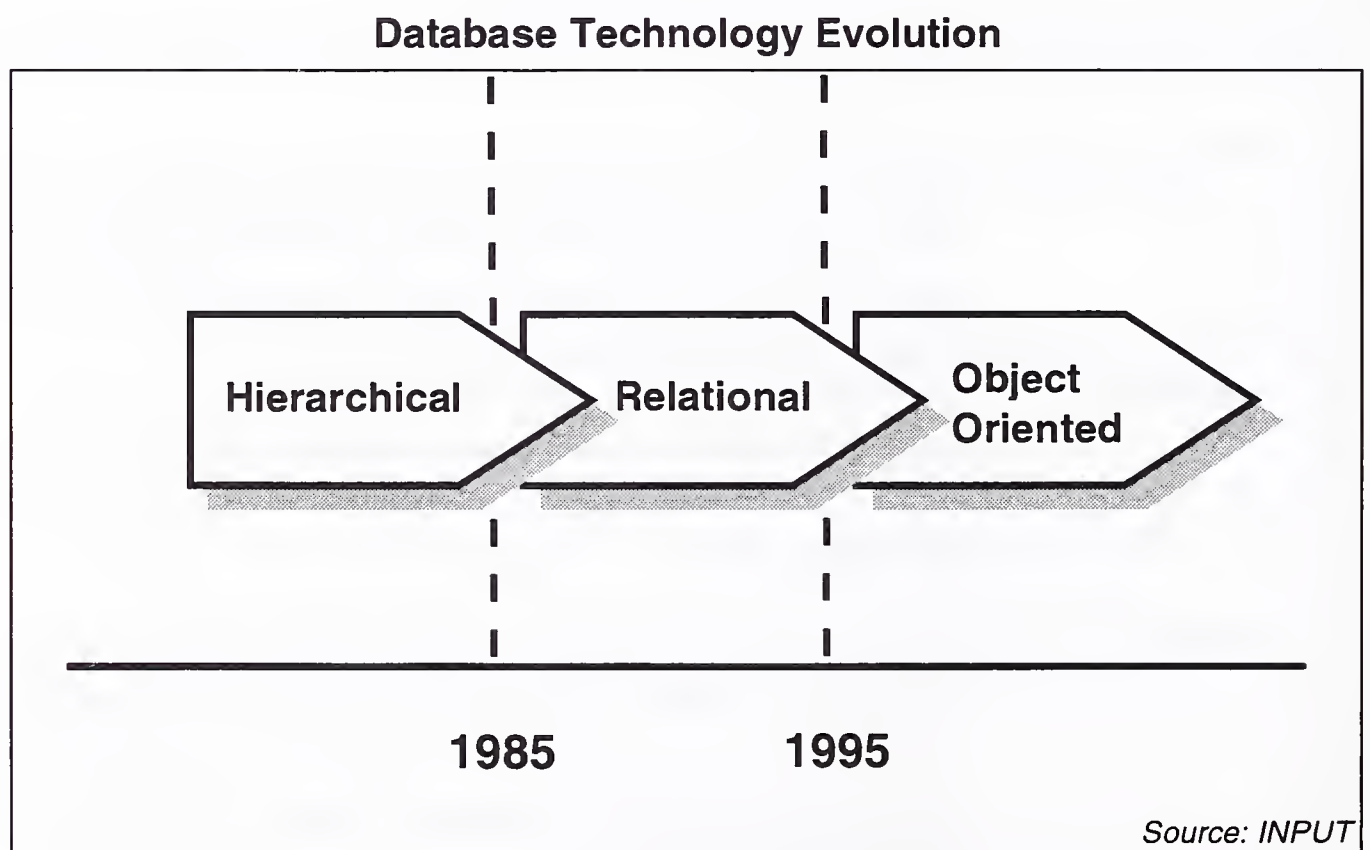
For example, Oracle has created an integrated data warehouse solution specifically for R/3 installations. Much of the services business generated by the implementation of these types of solutions will offer enormous

opportunities to systems integrators such as Andersen Consulting, CSC, and Oracle's close partner Price Waterhouse.

C**Large Installed Base of Relational Databases Constrains Transition to Object Databases**

Hierarchical databases have gradually been replaced by relational databases due to the ability of the latter to store and manipulate structured data in the form of text and numbers as opposed to a simple tree structure. However, the object-oriented model adds additional functionality to databases by enabling enterprises to store unstructured data such as images, sound and video. Hence a transition can be expected away from relational databases to object databases (see Exhibit IV-3)

Exhibit IV-3



Relational databases simply cannot match the performance of object-oriented databases when handling complex data types. This technology meets the needs of enterprises that run applications extracting huge amounts of data from an enterprise-wide database architecture. However, given that most enterprises currently run relational databases for business critical activities, object-oriented databases are being used in addition to existing infrastructures.

The slow transition to object database products is not surprising given the huge installed bases of relational databases and the big relational

database vendors' stranglehold on the database market. INPUT research reveals that only 10% of enterprises across Europe use object oriented databases. This figure may be an over-estimate given that it does not indicate what proportion of the databases are genuinely object-oriented and what proportion are in fact relational databases with object add-ons.

Enterprises are increasingly using middleware which facilitates the two-way transfer of data between object-oriented databases and relational databases. Of course, there is a drawback; middleware typically has an adverse effect on database performance.

The leading relational database vendors: Oracle, Sybase and Informix are adding object extensions to their existing products in response to the technology shift, thus facilitating the coexistence of the two types of technology and the inevitable transition to object database technology without putting themselves at a competitive disadvantage.

Object database vendors do exist, but large enterprises are reluctant to invest in technology from smaller organisations given that they may not survive for very long, and often have chequered financial backgrounds. For example, Object Design, the largest object database vendor, only attained profitability in the first and second quarters of 1996 after having run up losses of \$38 million. Indeed, such vendors are likely to be acquired by the relational database vendors in order that their technology can be integrated into new releases of the latter's products. For example, Informix recently acquired Illustra and is integrating Illustra's object technology into its Universal Server product.

The major driver behind the popularity of object databases is the increasing importance of the Internet to enterprises. The ability of object databases to manipulate unstructured data types is critical to the development of Web-based applications.

Standards are necessary in order to ensure that applications, particularly Web-based applications, function on all object databases that adhere to them. Indeed, the Object Database Management Group (ODMG) is currently working on standards for this purpose. Adherence to the standards will ensure application compatibility with ODMG certified products. This is certainly not the case in the relational market where different varieties of SQL restrict interoperability.

The implementation of object extensions and associated middleware to existing database infrastructures, combined with a transition to object-

oriented environments offers opportunities to database services vendors. As with data warehousing, vendors must sell the business benefits of the technology and refrain from using jargon wherever possible. The consultancy and implementation opportunities in this area are particularly significant. However, given the anticipated increased manageability of object technology, reactive support opportunities may be limited.

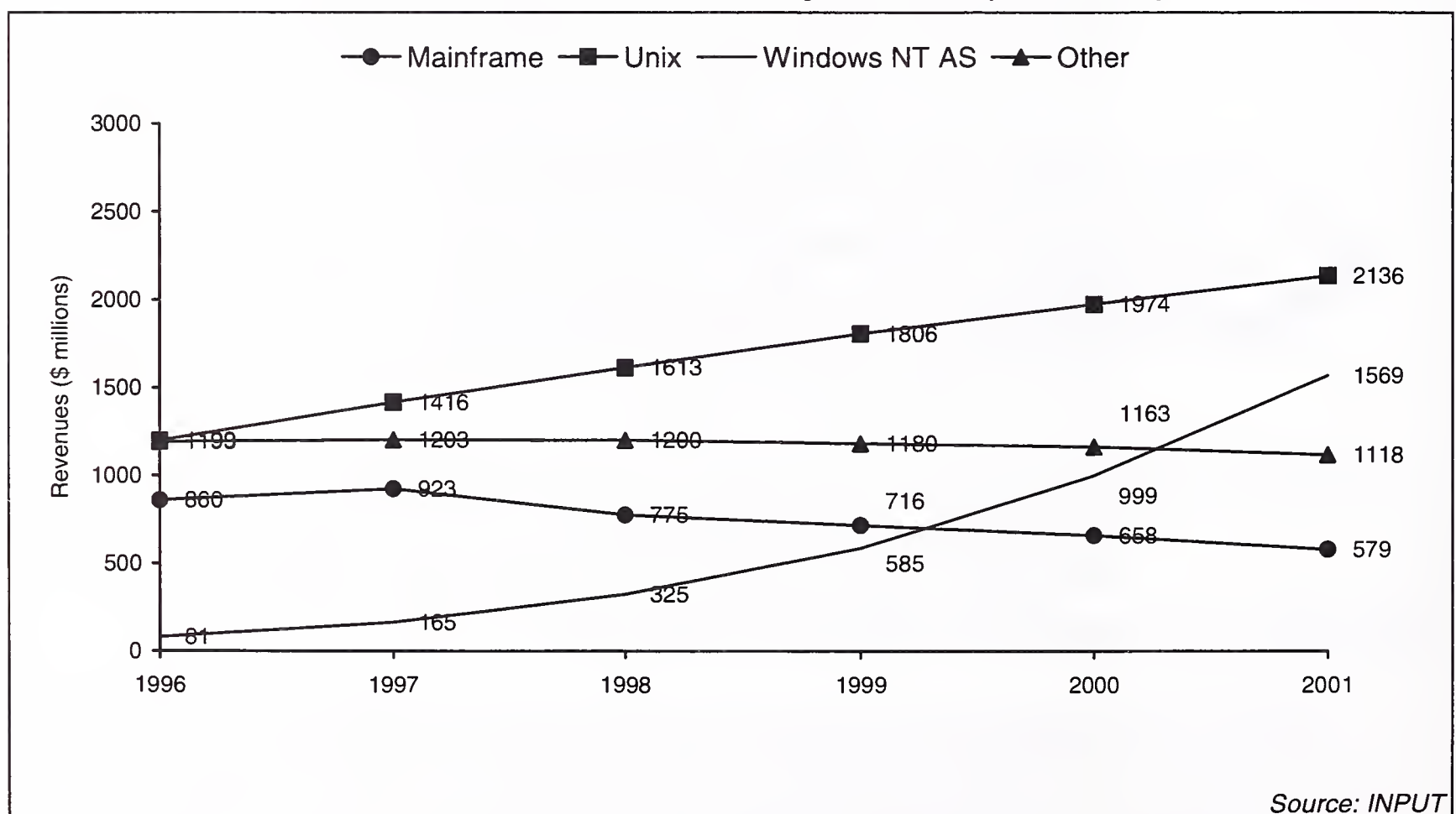
D

NT Server Opens Workgroup/Departmental Market Segment

When viewed in terms of operating platforms, the strongest opportunities for database services vendors currently lie in the fast growing Unix and Windows NT Advanced Server markets (see Exhibit IV-4).

Exhibit IV-4

Growth in RDBMS Revenues by Platform (\$ millions)



The most notable user segment that offers significant database services growth potential is the workgroup/departmental segment. This segment has been opened up by the widespread adoption of Windows NT Server. NT facilitates the use of powerful databases at this level. Consequently, database vendors are developing 'lite' versions of their products that are designed to offer as much functionality as possible at the workgroup/departmental level.

Netware, which is being adversely affected by NT Server in this market segment was never successful as a relational database platform largely due to the expense of running relational databases on Netware loadable modules and resource allocation problems.

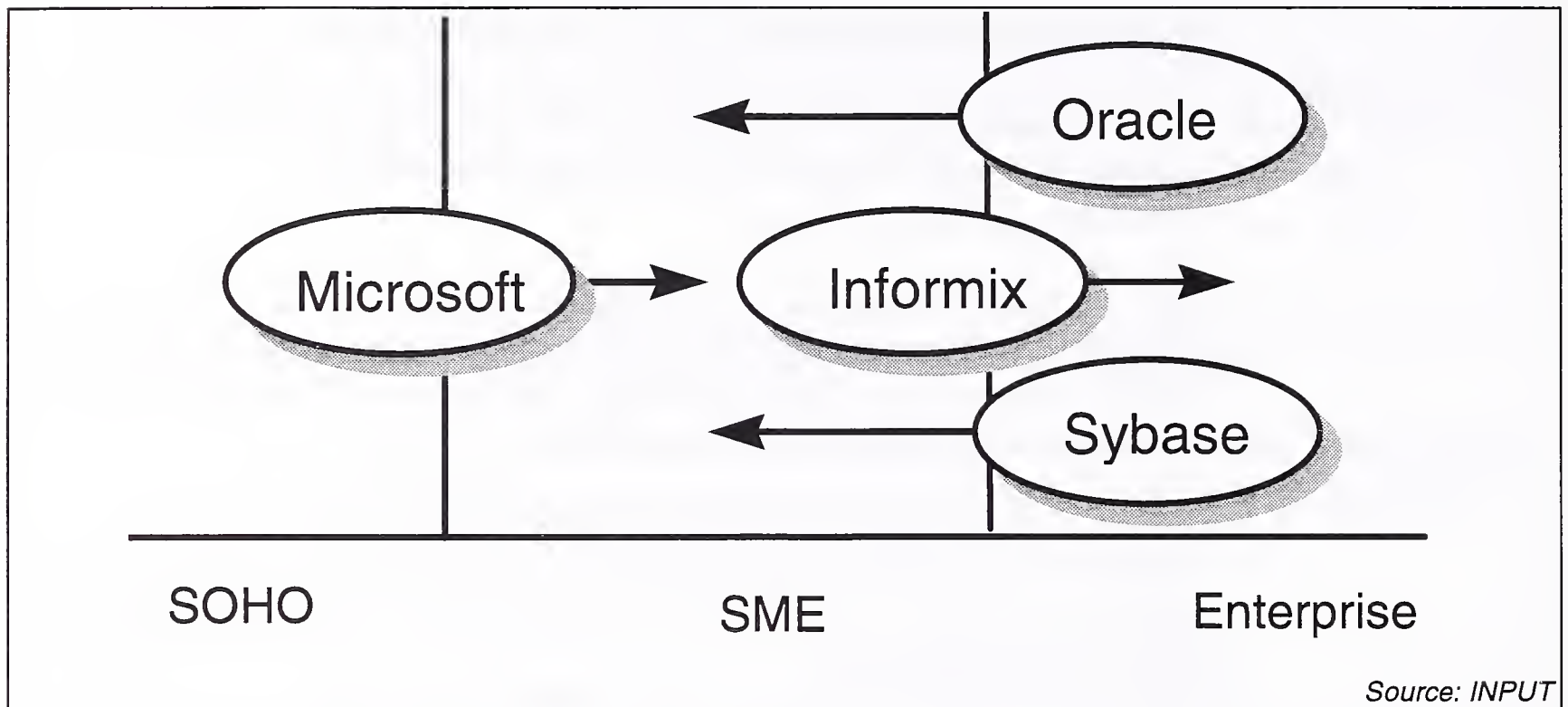
Database vendors are increasingly developing 'lite' versions of their products to run in the workgroup/departmental space. For example Oracle is focusing strongly on NT and is developing Oracle 7 based products for the NT operating system.

Any department or workgroup with a reasonable sized budget can buy a few PCs, connect them to a LAN, and hire a programmer to create its own Online Transaction Processing (OLTP) application.

Shrink-wrapped software packages are also becoming available off-the-shelf, giving departments the ability to carry out complex business processes. Essentially, NT Server, and powerful 'lite' versions of relational databases have lowered the barriers of entry for creating private or departmental OLTP systems.

Microsoft's SQL Server is making inroads into the departmental/workgroup space and is becoming more scalable with each new release. Oracle and Sybase have responded quickly to this threat by releasing 'lite' versions of their products aimed at keeping Microsoft at bay. Meanwhile, Informix has been focusing on establishing itself as an enterprise-wide database player largely at the expense of Sybase (see Exhibit IV-5).

Exhibit IV-5

Database Vendor Positioning

Database services vendors have the opportunity to respond to the rapidly growing market for services at the workgroup/departmental level. Flexible, cheaper services offerings must be introduced given that departments have relatively small budgets.

Some vendors such as Sybase and Microsoft, have introduced per incident pricing for software support to give low end customers access to support.

However, in order to generate profits from this segment, vendors rely on high volumes of business. Furthermore, it is necessary to invest in an infrastructure to provide a high volume of low margin services, in particular software support services, to this segment. Several vendors have responded to this challenge by outsourcing their first line support to help desk specialists. For example, Sybase now outsources its first line support to Sykes.

E

Web-Enabled Databases Drive New Paradigm Shift

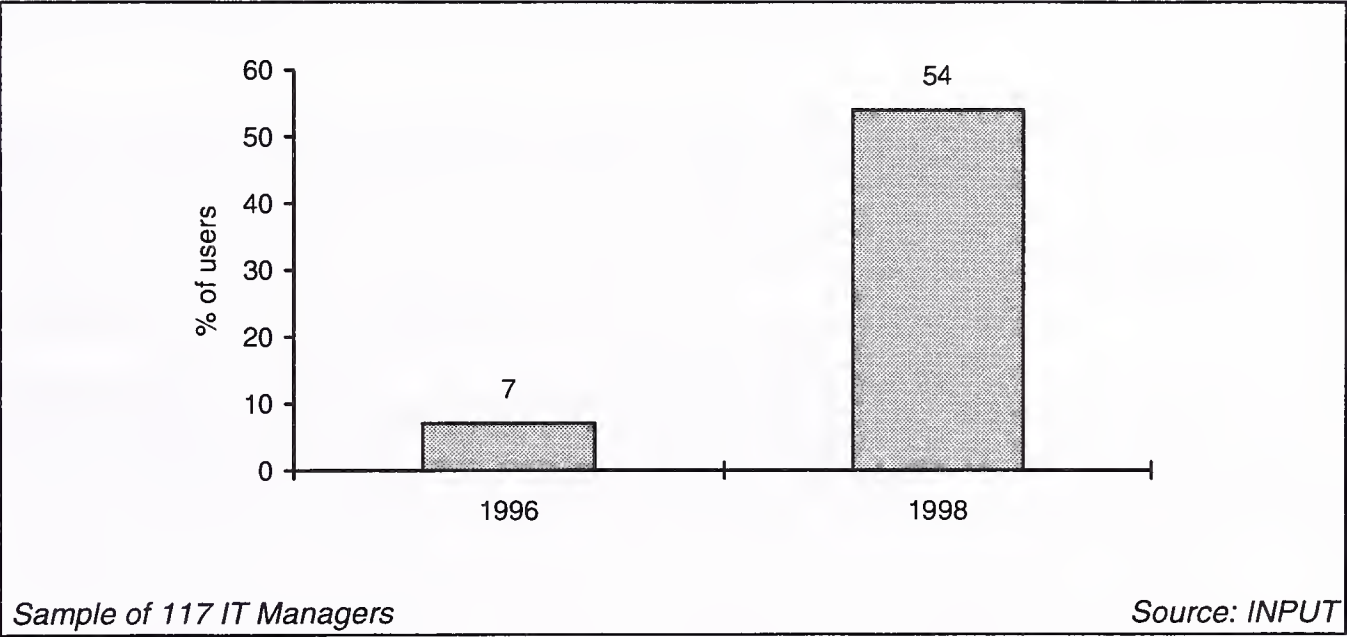
Databases now carry out many business critical activities such as operational transactions, the provision of strategic information to senior management, and marketing.

The increased functionality of the Web is enabling businesses to communicate with both customers and suppliers more effectively and driving the need for reliable Web front ends to existing database infrastructures. This is enabling enterprises to transfer more business critical activities to the Web.

INPUT research reveals that 7% of enterprises now have a Web front end for at least one of their databases (see Exhibit IV-6). Moreover, in two years time, more than half of Europe’s enterprises will have implemented Web front ends to at least one of their databases.

Exhibit IV-6

Proportion of Enterprises with Database Web Front Ends, Europe



Database vendors are increasingly offering add-on tools that link their products to the Web. In a similar fashion to linking relational databases to object databases, middleware vendors are offering tools, such as Information Builders’ EDA/Open Database Gateway, to incorporate existing data with Web front ends.

The integration of powerful databases to the Web is driving the use of the Web as an applications platform. By running on databases, Web-based applications can now undertake many business processes including operational transactions and marketing.

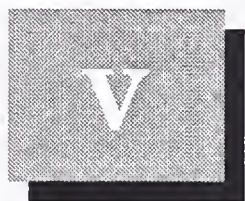
Many enterprises have introduced Web-based applications to extend their markets. For example, Sainsbury and Tesco, the UK's two largest food retailers, are both experimenting with Web-based shopping where customers can select and purchase goods over the Web and have them delivered.

Linking existing databases to the Web is being made easier by the availability of compliant server software. Microsoft's Internet Information Server and Open Market's OM-Axcess facilitate the linking of relational databases to the Web. Interestingly, Netscape has integrated a relational database into its Commerce Server product.

The Java language allows applications to be implemented on the Web with links to databases using Java which allows Java applets to be connected to business applications. Furthermore, Microsoft's ActiveX technology offers the necessary functionality to link Web front ends with internal databases.

Again, the planning and design, and implementation opportunities offered by the increase in demand for Web front ends will further drive the services market centred around enterprise-wide database products.

If Web implementations are object-oriented, the reactive support opportunities will be limited. However, if implementing a Web front end to a database involves the use of numerous middleware products and database add-ons, the reactive support opportunities will be significant.



Analysis of User Survey by Country

This chapter segments INPUT's research findings by country. It provides commentary on both the proportions of users sourcing services centred around enterprise-wide databases from external vendors, and user perceptions of those services in the United Kingdom, Germany, France and Italy.

A

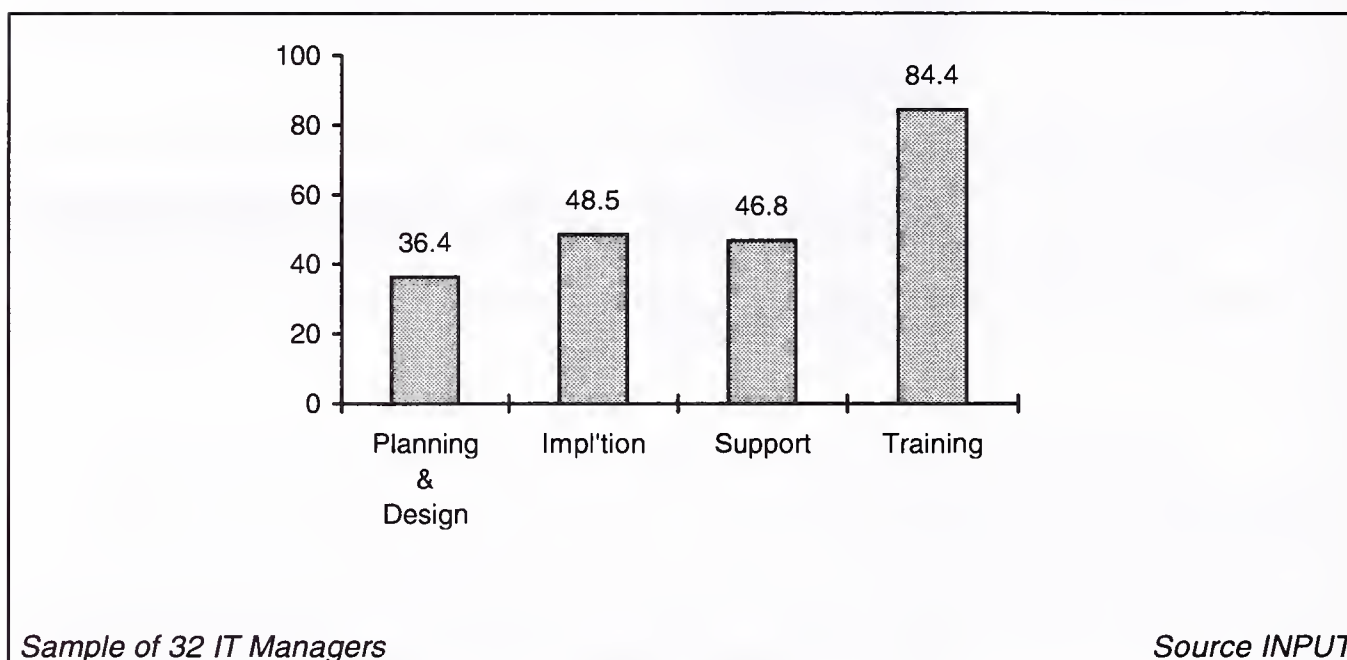
United Kingdom

The UK economy is currently growing more rapidly than the German, French or Italian economies.

Migration to both Unix and Windows NT Advanced Server client/server environments is relatively advanced, leading to opportunities for services centred around distributed database infrastructures. Furthermore, the UK database market is the most mature in terms of the adoption of new technologies such as Web enabled databases, object databases and data warehousing, which offers vendors a plethora of associated services opportunities.

Exhibit V-1 reveals the proportions of enterprise-wide database services sourced externally in the United Kingdom.

Exhibit V-1

**Proportion of Users Sourcing Database Services Externally,
United Kingdom**

The proportion of users sourcing database services externally is lower in the United Kingdom than in Germany and Italy. This is perhaps surprising considering that the outsourcing and systems integration markets in the UK are relatively mature.

The findings can be explained by the fact that the UK has a high concentration of very large enterprises. By virtue of their size, many enterprises in the UK have large IT infrastructures which in effect compete strongly with external services vendors.

Exhibits V-2 to V-5 illustrate UK user perceptions of services centred around enterprise-wide databases in terms of importance, satisfaction and value for money.

Exhibit V-2

User Perceptions of Software Support Services, United Kingdom

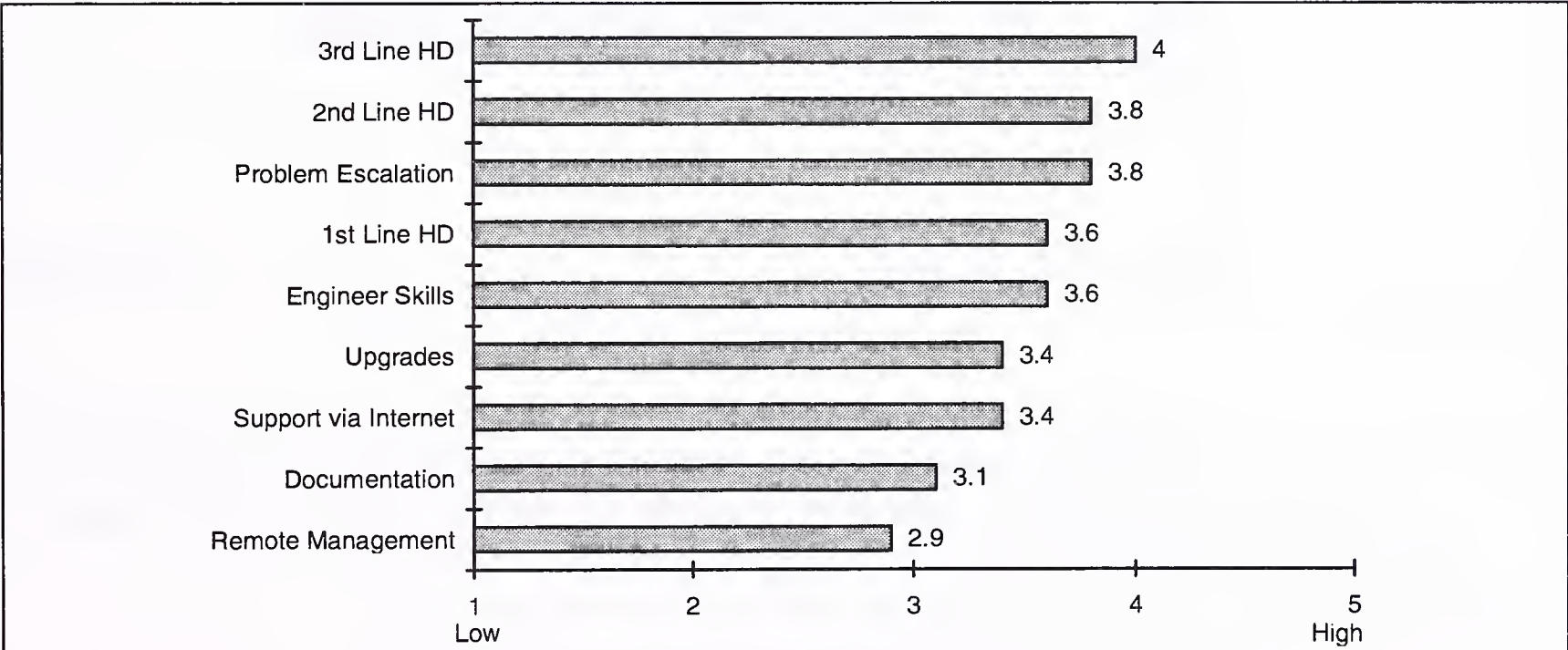
	Importance	Satisfaction	Difference
Problem Escalation	4.6	4.0	0.6
1 st Line Help Desk Support	4.4	4.0	0.4
2nd Line Help Desk Support	4.3	4.3	0
3rd Line Help Desk Support	4.2	4.2	0
Engineering Skills	4.2	3.9	0.3
Support Documentation	4.1	3.5	0.6
Update Provision	4.0	3.4	0.6
Remote Software Maintenance	3.7	3.4	0.3
Support via the Internet	2.6	2.6	0

Sample of 32 IT Managers

Source: INPUT

Exhibit V-3

Value for Money of Software Support Services, United Kingdom



Sample of 32 IT Managers

Source: INPUT

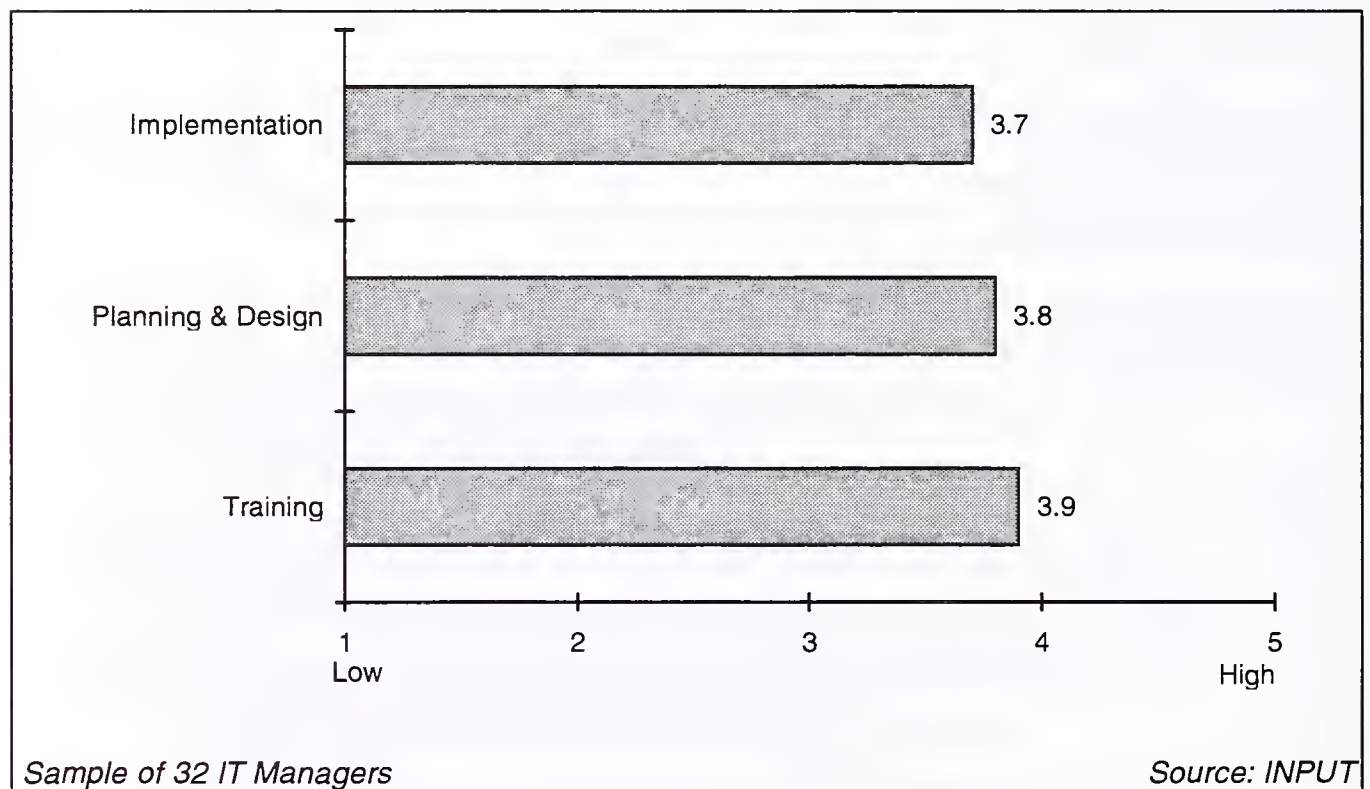
Exhibit V-4

User Perceptions of Software Services, United Kingdom

	Importance	Satisfaction	Difference
Planning & Design	4.7	4.0	0.7
Implementation	4.6	3.9	0.7
Training	4.6	4.0	0.6

*Sample of 32 IT Managers**Source: INPUT*

Exhibit V-5

Value for Money of Software Services, United Kingdom*Sample of 32 IT Managers**Source: INPUT*

Enterprise-wide database users in the United Kingdom express high levels of satisfaction with most services. However, importance ratings and satisfaction ratings diverge significantly for documentation and problem escalation.

B

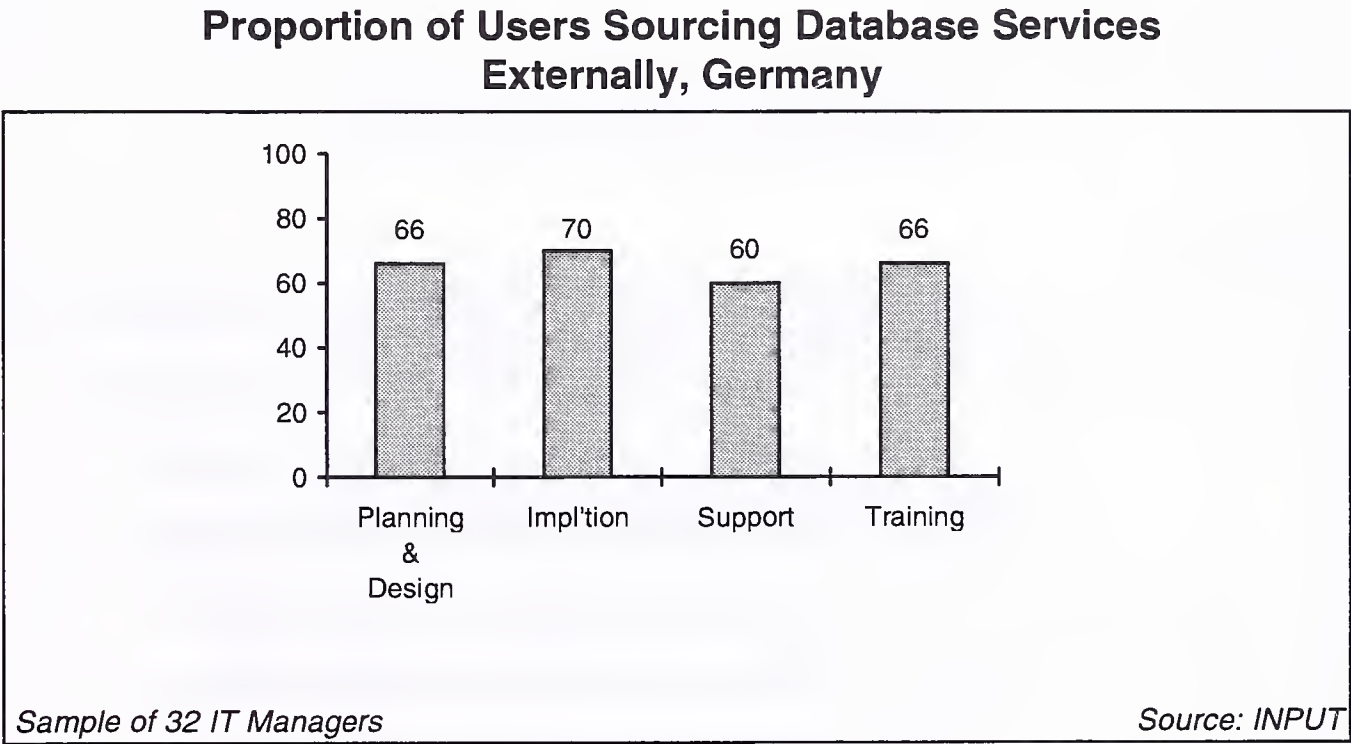
Germany

The German economy is currently experiencing deflationary pressures, hence demand is not buoyant.

German users are relatively conservative in their use of IT. They tend not to invest in new technologies until their usefulness has been proven. Consequently, both mainframe sales and demand for services centred around databases running on mainframes are relatively strong.

Exhibit V-6 reveals the proportions of enterprise-wide database services sourced externally in Germany.

Exhibit V-6



The proportion of users sourcing database services externally is relatively high in Germany which suggests that a high proportion of German enterprises lack the necessary in-house resources to effectively design, implement and support their database infrastructures. Interestingly, one third of German enterprises provide training using in-house resources, a higher proportion than that in the UK, France or Italy.

Exhibits V-7 to V-10 illustrate German user perceptions of services centred around enterprise-wide databases in terms of importance, satisfaction and value for money.

Exhibit V-7

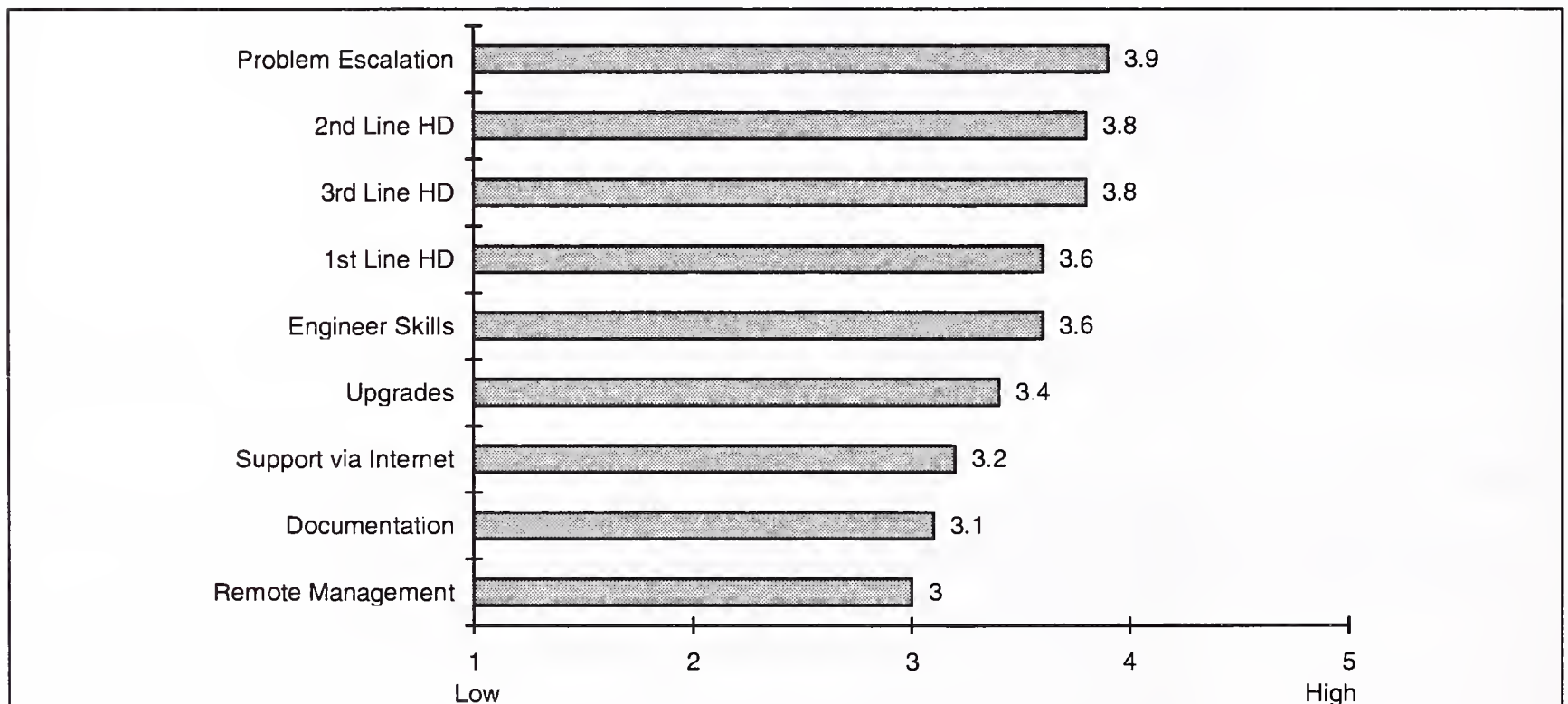
User Perceptions of Software Support Services, Germany

	Importance	Satisfaction	Difference
Problem Escalation	4.5	4.0	0.5
1 st Line Help Desk Support	4.3	4.0	0.3
2nd Line Help Desk Support	4.3	4.2	0.1
3rd Line Help Desk Support	4.2	4.1	0.1
Engineering Skills	4.2	3.9	0.3
Support Documentation	4.1	3.5	0.6
Update Provision	3.9	3.5	0.4
Remote Software Maintenance	3.8	3.4	0.4
Support via the Internet	2.6	2.3	0.3

Sample of 31 IT Managers

Source: INPUT

Exhibit V-8

Value for Money of Software Support Services, Germany

Sample of 31 IT Managers

Source: INPUT

Exhibit V-9

User Perceptions of Software Services, Germany

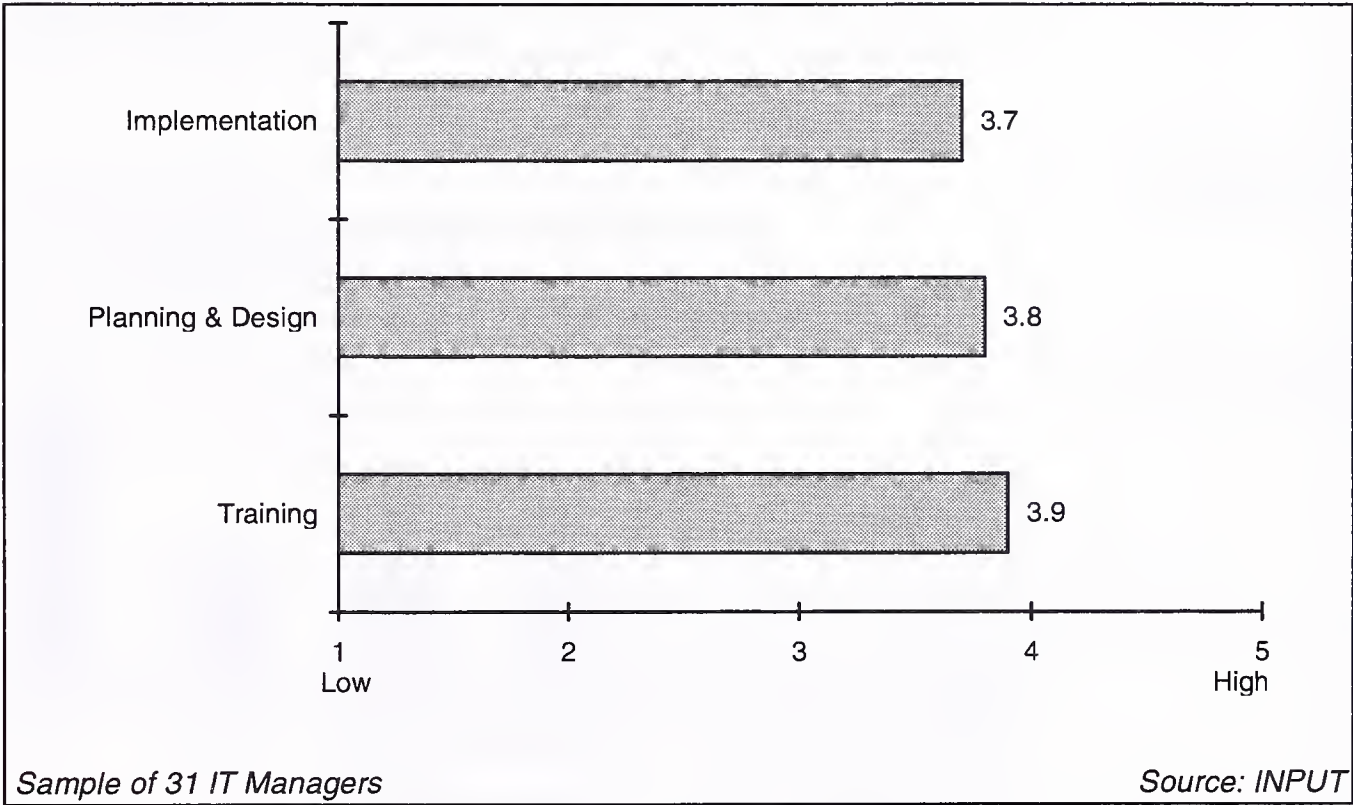
	Importance	Satisfaction	Difference
Planning & Design	4.6	3.9	0.7
Implementation	4.6	3.9	0.7
Training	4.6	4.0	0.6

Sample of 31 IT Managers

Source: INPUT

Exhibit V-10

Value for Money of Software Services, Germany



German user perception are remarkably similar to those in the United Kingdom.

C

France

In common with the German economy, the French economy is currently experiencing extreme deflationary pressures which are severely constraining demand.

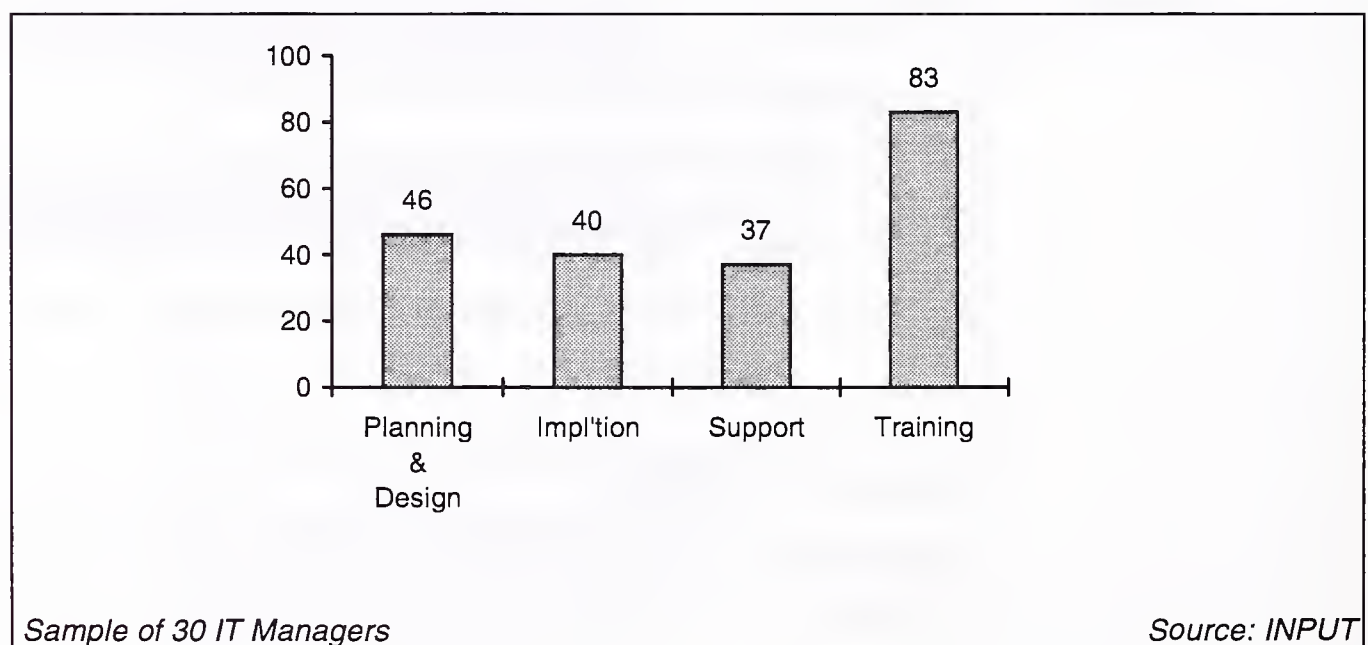
France has a mature IT services market and adopts new technology rapidly. However, given the prevalence of Minitel, widespread acceptance of the Internet as an information delivery channel is likely to be relatively slow.

French enterprises have the largest databases in Europe which augurs well for vendors offering data warehousing services in France.

Exhibit V-11 reveals the proportions of enterprise-wide database services sourced externally in France.

Exhibit V-11

Proportion of Users Sourcing Database Services Externally, France



France sources relatively low proportions of its database services (with the exception of training services) from external vendors. As with the UK, this can be explained by the widespread existence of in-house resources designed to support IT activities.

Exhibits V-12 to V-15 illustrate French user perceptions of services centred around enterprise-wide databases in terms of importance, satisfaction and value for money.

Exhibit V-12

User Perceptions of Software Support Services, France

	Importance	Satisfaction	Difference
Problem Escalation	4.5	4.0	0.5
1 st Line Help Desk Support	4.3	4.0	0.3
2nd Line Help Desk Support	4.3	4.2	0.1
3rd Line Help Desk Support	4.2	4.1	0.1
Engineering Skills	4.2	3.9	0.3
Support Documentation	4.1	3.5	0.6
Update Provision	3.9	3.5	0.4
Remote Software Maintenance	3.8	3.4	0.4
Support via the Internet	2.6	2.3	0.3

Sample of 30 IT Managers

Source: INPUT

Exhibit V-13

Value for Money of Software Support Services, France

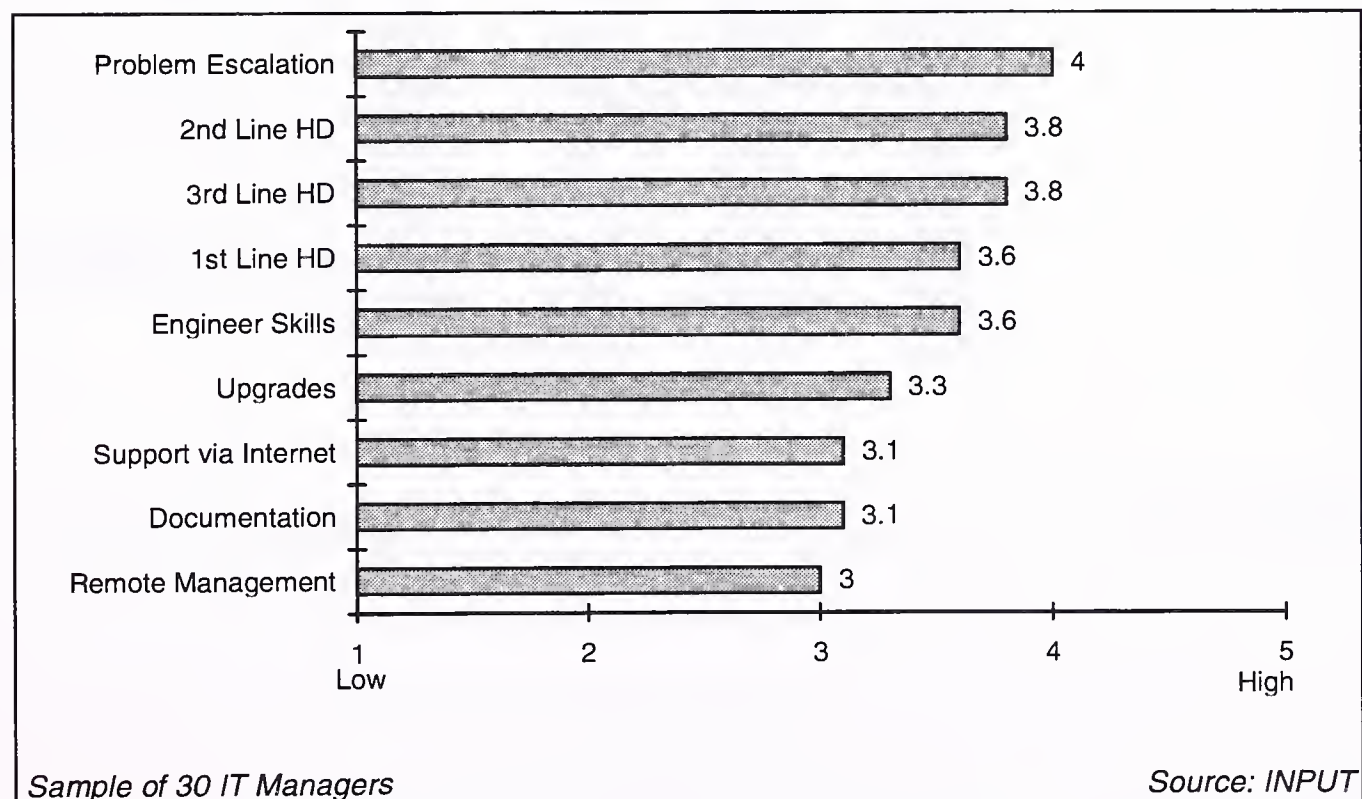


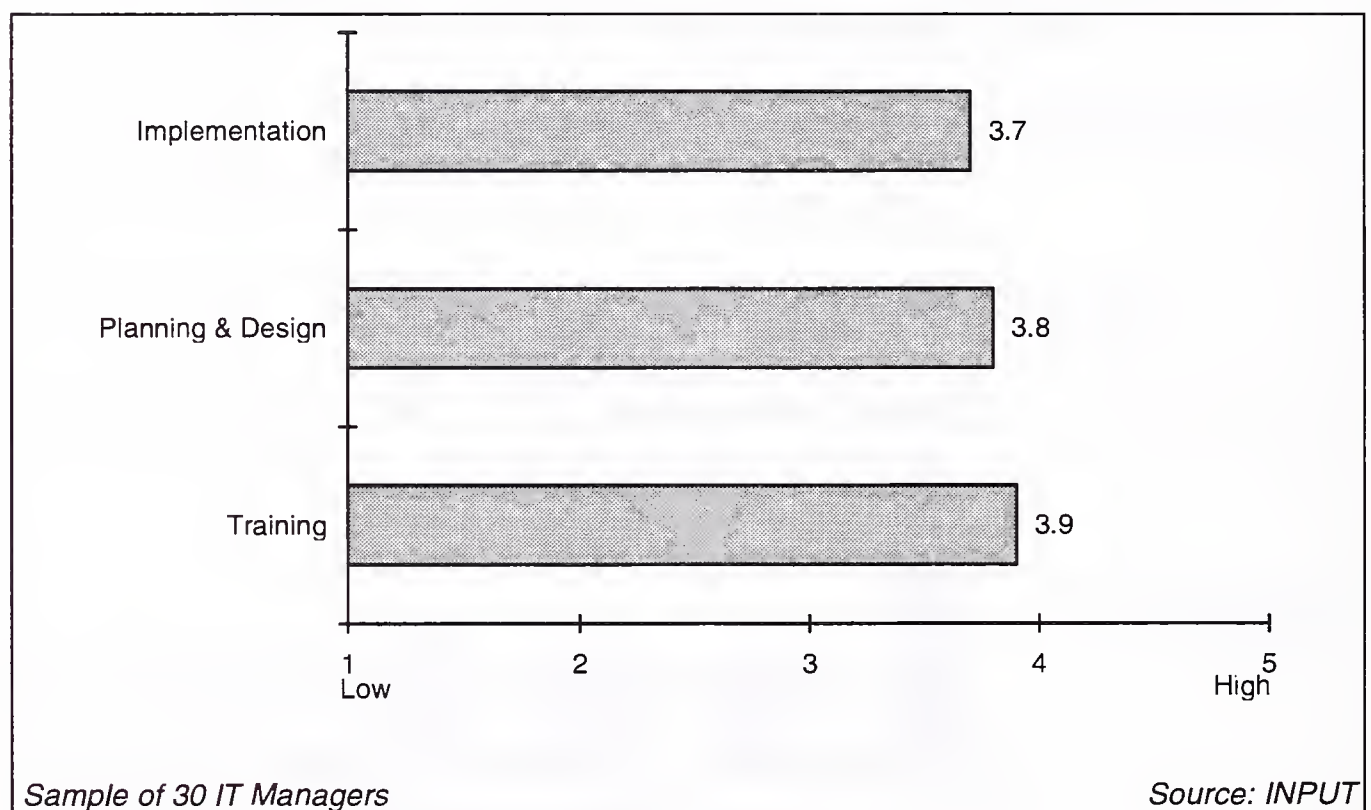
Exhibit V-14

User Perceptions of Software Services, France

	Importance	Satisfaction	Difference
Planning & Design	4.6	3.9	0.7
Implementation	4.6	3.9	0.7
Training	4.6	4.0	0.6

*Sample of 30 IT Managers**Source: INPUT*

Exhibit V-15

Value for Money of Software Services, France

Enterprise user perceptions in France do not differ significantly from those in the United Kingdom and Germany.

D
Italy

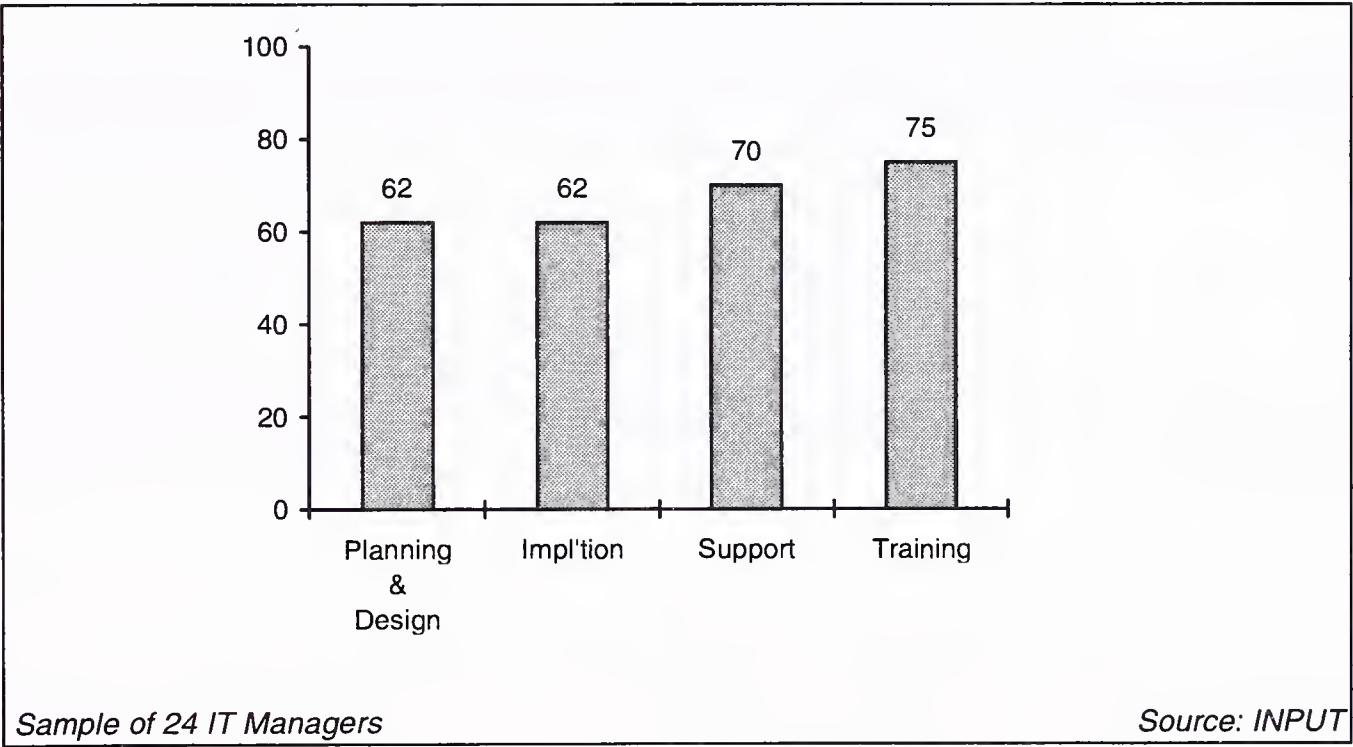
As Italian politicians attempt to ensure that Italy is in the ‘first wave’ of countries joining the single European currency, the economy will experience severe recessionary pressures. Italy has a particularly high budget deficit which must be cut dramatically in order to come close to satisfying the Maastricht criteria.

The Italian economy is characterised by the prevalence of small and medium sized companies, typically family-owned. Consequently, the country has a high proportion of mid-range proprietary systems most notably AS/400s. Windows NT Advanced Server and Unix will gradually erode the installed base of AS/400s (particularly NT) due to the wider availability of applications that can run on these platforms.

Exhibit V-16 reveals the proportions of enterprise-wide database services sourced externally in Italy.

Exhibit V-16

Proportion of Users Sourcing Database Services Externally, Italy



Italy sources relatively high proportions of its database services (with the exception of training services) from external vendors. This can be explained by the fact that the smaller enterprises that are common in Italy do not have sufficient in-house resources to meet their requirements. External vendors do not face stiff competition from within the enterprise for the provision of services.

Exhibits V-17 to V-20 illustrate Italian user perceptions of services centred around enterprise-wide databases in terms of importance, satisfaction and value for money.

Exhibit V-17

User Perceptions of Software Support Services, Italy

	Importance	Satisfaction	Difference
1 st Line Help Desk Support	4.5	4.2	0.3
Engineering Skills	4.4	4.1	0.3
Problem Escalation	4.3	4.0	0.3
Support Documentation	4.3	3.8	0.5
Update Provision	4.1	3.9	0.2
2nd Line Help Desk Support	4.1	4.1	0
3rd Line Help Desk Support	4.1	4.0	0
Remote Software Maintenance	3.6	3.7	-0.1
Support via the Internet	2.0	3.4	-0.4

Sample of 24 IT Managers

Source: INPUT

Exhibit V-18

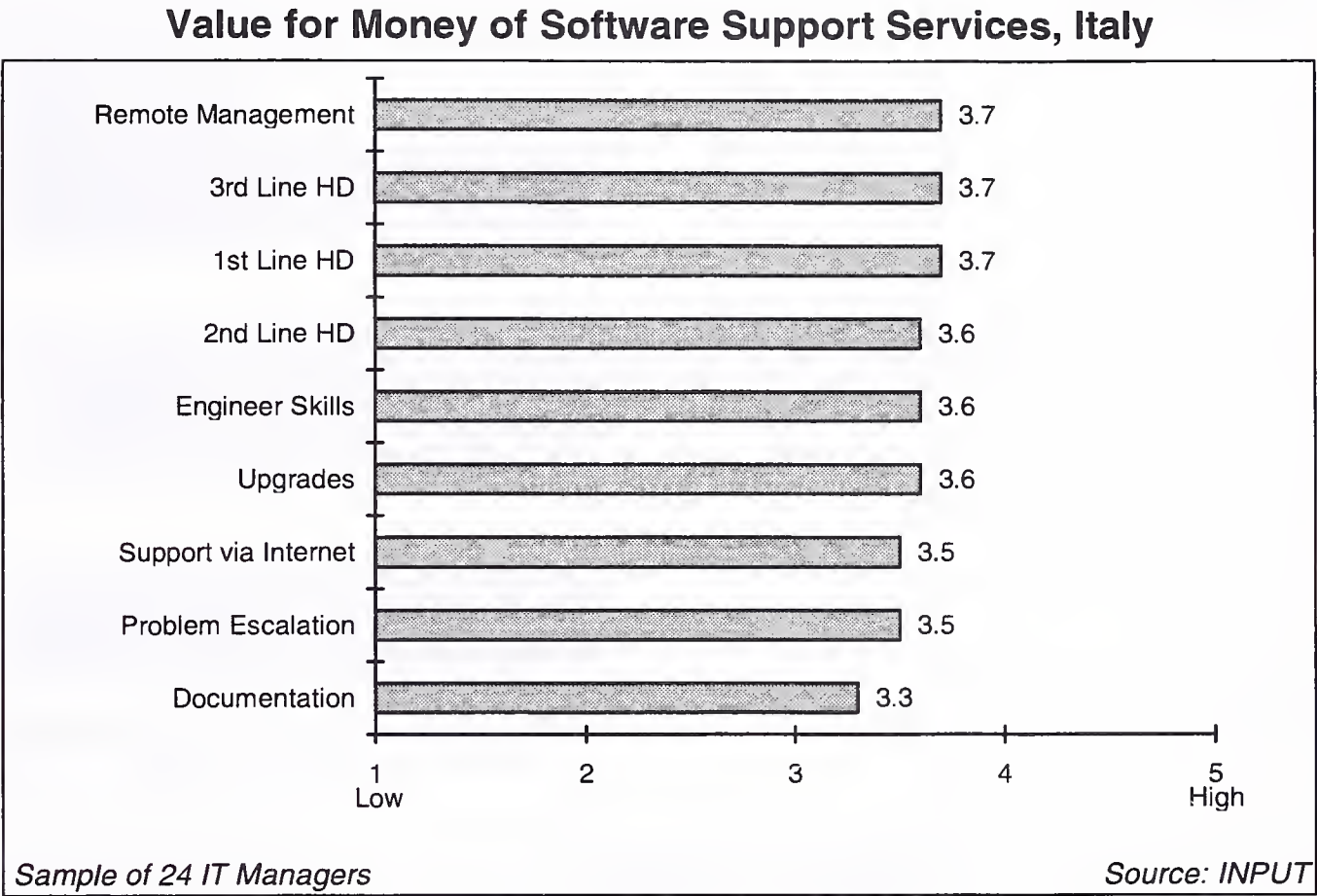


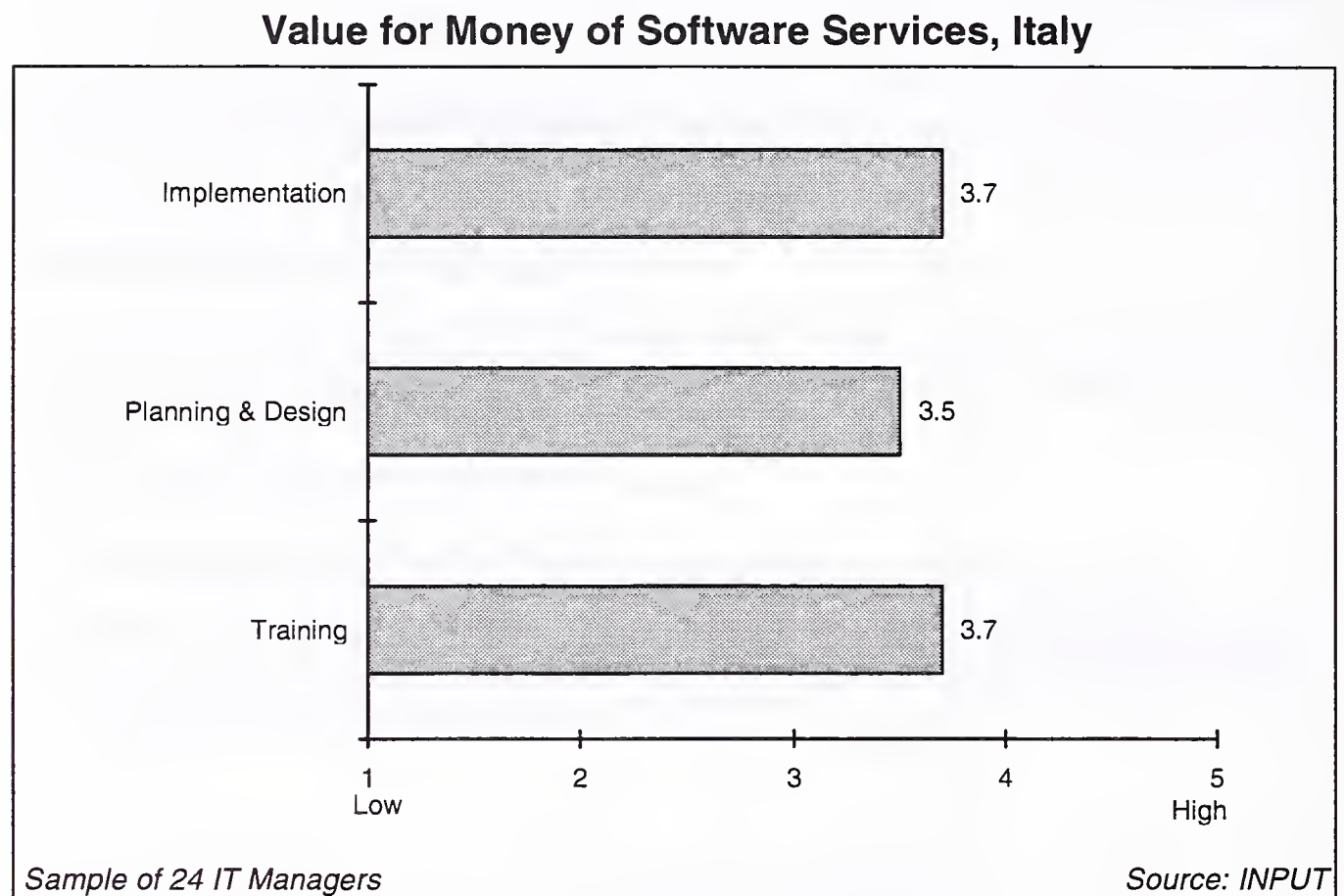
Exhibit V-19

User Perceptions of Software Services, Italy

	Importance	Satisfaction	Difference
Planning & Design	4.3	4.0	0.3
Implementation	4.4	4.2	0.2
Training	4.5	4.1	0.4

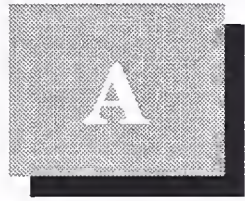
Sample of 24 IT Managers *Source: INPUT*

Exhibit V-20



There are a number of differences in Italian user perceptions of services centred around enterprise-wide databases when compared to those in the United Kingdom, Germany, and France:

- Value for money ratings are generally lower than those in the other major economies
- The differences between importance and satisfaction for most services are lower in Italy than in the other three countries.



Enterprise Database User Questionnaire

A Questionnaire Respondent Details

Company Name

Respondent Name

Job Title

This questionnaire is designed to provide information relating to services centred around multi-user, enterprise-wide databases (e.g. Oracle, Informix, Sybase, DB2, Microsoft SQL Server, CA-INGRES). It asks questions relating to the product lifecycle from planning and design to support.

1. Does your business run an enterprise-wide database?

Yes

No

If no, please terminate the interview

Can I ask some questions about the enterprise-wide database that you implemented most recently.

2. When was it implemented?

3. Please name the database?

4. On what operating system is it currently running?

5. From whom did you purchase the database?

6. From whom did you purchase the majority of the services centred around your database?

The publisher of the database

A third party services vendor

Other (please specify)

B**Software Planning and Design Services**

7. What were the main challenges involved in effectively planning and designing your database?

8. Did you purchase any planning and design services externally for the database?

Yes

No

9. Why/why not?

If no to Q8, go to Q13

10. From whom did you purchase the planning and design services?

11. Please indicate your level of satisfaction, the importance of the planning and design services to your business, and the value for money that you feel you received from your external vendor (1=low, 5=high).

Satisfaction (1-5)

Importance (1-5)

Value for money (1-5)

12. How do you feel that these external planning and design services could be improved?

C

Software Implementation Services

13. What were the main challenges that occurred when implementing (installation, configuration, system integration) your database?

14. Was the database implemented or partially implemented by an external organisation?

Yes

No

15. Why/why not?

If no to Q14, go to Q20

16. From whom did you purchase the implementation services?

17.

If you received any implementation services from an external vendor, please indicate your satisfaction with these services, the importance of these services to your business and the degree to which you feel that you received value for money (1=low, 5=high).

Satisfaction (1-5)

Importance (1-5)

Value for money (1-5)

18a.

Were any of these services delivered remotely?

Yes

No

18b.

If yes, which ones?

18c.

What mechanisms are used for remote delivery of implementation services

Internet

Point to point connection (direct link)

Other (please specify)

19.

How do you feel that externally provided implementation services could be improved?

D

Software Product Support Services

20.

What are the main challenges that you encounter when supporting your database?

21. Have you purchased any support from an external vendor for your database?

Yes

No

22. Why/why not?

23. From whom do you purchase the support services?

24. Please indicate the importance of the following database support services to your business and the value for money that you believe that they deliver (1=low, 5=high).

Additionally, please indicate which services are provided internally and which ones are provided by an external vendor.

Support Service	Importance (1-5)	Satisfaction (1-5)	Internal/ External	Value for Money (1-5)
Problem handling				
Problem escalation				
Documentation				
Update provision				
1 st line help desk support				
2 nd line help desk support				
3 rd line help desk support				
Remote software maintenance				
Support delivered via the Internet				
Engineer skills				

25. Please indicate the importance of the following database support options to you, whether or not you currently receive them and whether or not you are willing to pay an extra charge for them.

Options	Importance (1-5)	Currently receive (Yes/No)	Willing to pay an additional charge (Yes/No)
24*7 support			
Access to a dedicated account manager			
On-site account manager			
Service for other vendors' products (multivendor contract)			
Remote, automated support provision			
Early warnings			
On-site technical staff employed by external vendor			
Software asset management			
Version Control			
Guaranteed response times			
ISO 9000 quality standard			
Other (please specify)			

26. How do you believe that the database support services that you have received from an external vendor could be improved?

E**Training and Education Services**

27. Did you purchase training/education services for the database externally?

Yes

No

28. Why/why not?

If no to Q27, go to Q32

29. From whom did you purchase the training/education services?

30. Please indicate your level of satisfaction with the database training/education provision that you have received externally in the last 12 months. Additionally, please indicate the importance of these services to your business and the degree to which you believe that you received value for money (*1=low, 5=high*).

Satisfaction (1-5) Importance (1-5) Value for money (1-5)

31. How do you believe that the externally provided training services that you have received could be improved?

F

Sources

32.

Please indicate the importance of receiving all the external services required during the lifecycle of an database from one source (*1=low, 5=high*).

Importance (1-5)

33.

Please indicate the importance of receiving services centred around an database, from the publisher of that software product (*1=low, 5=high*).

Importance (1-5)

G

Technology

34.

Please indicate your current use of object architectures for your database applications

Object architecture	% of use (must add up to 100%)
CORBA	_____
OLE/COM/DCOM	_____
OpenDoc	_____
Other (please specify)	_____

35. What kind of application(s) do you run on your database?

Application	% (must add up to 100%)
-------------	-------------------------

Data warehousing	_____
------------------	-------

OLAP	_____
------	-------

OLTP	_____
------	-------

Content management	_____
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Other (please specify)	_____
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36a. What proportion of your database applications have a Web front end for public/private access?

_____ %

36b. And in 2 years time?

_____ %

Thank you for your assistance with this questionnaire.

